



City of Chicago
Richard M. Daley, Mayor

Department of Transportation

Miguel d'Escoto
Commissioner

Carmen Iacullo
Deputy Commissioner

Bureau of Inspections
Suite 1101
30 North LaSalle Street
Chicago, Illinois 60602-2570
(312) 744-6454
(312) 744-7747 (FAX)
(312) 744-7215 (TTY)

www.cityofchicago.org/transportation



226105

October 3, 2001

Ms. Verneta J. Simon
United States Environmental Protection Agency
Region 5
77 West Jackson Boulevard
Chicago, Illinois 60604

RE: Chicago Freight Tunnel Borehole Penetration into the
East Illinois Street Tunnel West of North Columbus Drive

Dear Ms. Simon:

In response to your request of August 28, 2001, the Chicago Department of Transportation(CDOT) is forwarding copies of plans for two (2) proposed borehole penetrations into the Chicago Freight Tunnel System.

The first proposed borehole penetration is for Global Crossing, a telecommunication provider. The penetration would be from a manhole located: 1 foot west of the west line of North Columbus Drive and 34 feet north of the south line of East Illinois Street.

The second proposed borehole penetration is for Qwest Network Construction Services, a telecommunication provider. The penetration would be from a manhole located: 110 feet east of the east line of North St. Clair Street and 39 feet north of the south line of East Illinois Street.

Each penetration will require drilling an eight (8) inch diameter borehole from existing grade to the top of and through the roof of the existing underground freight tunnel (approximately 40 feet below grade). After a borehole is drilled, a casing will be installed and the annular area between casing and the borehole will be grouted.

In addition, enclosed is a copy of the Chicago Department of Environment's Health and Safety Plan. Should you have any questions, please contact Mr. Manohar Chawla of my office at (312) 744-3530.

Very Truly Yours,

Carmen Iacullo
Deputy Commissioner
Bureau of Inspections

Originated by:

Manohar S. S. Chawla
Coordinating Engineer
Quality Assurance Division

cc: Steve Chippas
Ronald Kaminski

Larry Pianto





Global Crossing

"GC-TB-1"

FIBER OPTIC CONDUIT INSTALLATION CHICAGO FREIGHT TUNNEL PENETRATION ILLINOIS STREET & COLUMBUS DRIVE CHICAGO, ILLINOIS

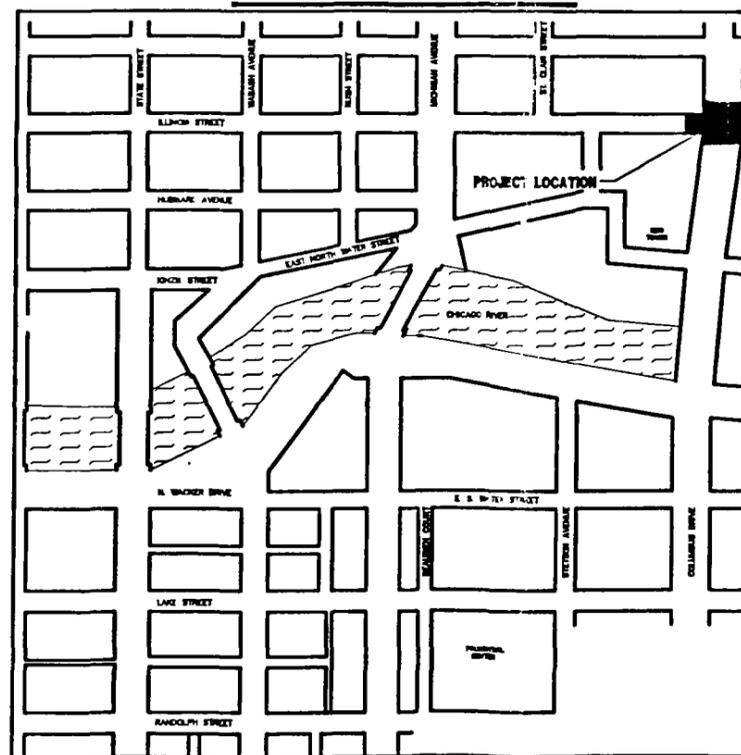
LEGEND

PROPOSED GLOBAL CROSSING MANHOLE	■
PROPOSED TRENCHED CONDUIT	— —
EXISTING NEXTLINK MANHOLE	○
EXISTING AMERITECH MANHOLE	⊙
EXISTING 21 CENTURY MANHOLE	⊕
EXISTING LEVEL (3) MANHOLE	⊖
EXISTING OPEN LID SEWER	⊗
EXISTING COMED MANHOLE	⊘
EXISTING ELECTRIC MANHOLE	⊙
EXISTING TRAFFIC BOX	⊗
EXISTING CLOSED LID SEWER	○
EXISTING WATER VALVE	⊖
EXISTING GAS VALVE	⊗
EXISTING MCI MANHOLE	⊕
EXISTING UNICOM MANHOLE	⊖
EXISTING FIRE HYDRANT	⊗
EXISTING UNKNOWN STRUCTURE	⊙
EXISTING PARKING METER	⊖
EXISTING TRAFFIC LIGHT	⊗
EXISTING STREET LIGHT	⊕
EXISTING UTILITY POLE	⊖
EXISTING STREET SIGN	⊕
EXISTING GARBAGE CAN	⊙
EXISTING PLANTER	⊖
EXISTING BIKE RACK	⊗
EXISTING SUPPORT/COLUMN	⊗
EXISTING TREE	⊗
ABANDONED CTA TRACKS & CONDUIT	— —
EXISTING SEWER	— —
EXISTING WATER MAIN	— —

CONTRACTOR:

John burns
construction company
P.O. BOX 827
ORLAND PARK, ILLINOIS 60462-0827
(708) 479-2143 FAX (708) 479-4956
(312) 242-1025

SITE LOCATION MAP



PROJECT BENCHMARK

CITY OF CHICAGO BENCH MARK NO. 1467: ILLINOIS STREET EAST OF MICHIGAN AVENUE. MARK CUT ON SOUTHEAST CORNER OF CONCRETE SILL OF ENTRANCE ON SOUTH SIDE OF BUILDING. (LOWER LEVEL) ELEVATION = 14.243

NOTE:
ONLY PRINTS WITH AN EMBOSSED SEAL ARE TO BE USED DURING CONSTRUCTION AND CONSIDERED OFFICIAL COPIES. THESE PLANS ARE NOT TRANSFERABLE.

INDEX TO SHEETS

1. TITLE, LEGEND, PROJECT BENCHMARK
- 2.-4. GENERAL NOTES
5. PROJECT PLAN VIEW
6. TUNNEL BORE CROSS SECTION
7. TUNNEL PLAN VIEW
8. STANDARD CONSTRUCTION DETAILS

ENGINEER'S ESTIMATE OF MATERIALS

1-6" DIAMETER TUNNEL BORE
1-4'X4'X4' COMMUNICATIONS MANHOLE
40' OF 6" DIAMETER STEEL CASING PIPE



EXPIRES 11-30-01

James R. Jackson, Jr.
SIGNATURE
8/20/01
DATE

ENGINEER:



(312) 432-0076 FAX:(312) 432-0231
STATE OF ILLINOIS, DEPARTMENT OF PROFESSIONAL REGULATION. LICENSE NO. 184-002308

HBK ENGINEERING, LLC
921 W. VAN BUREN STREET
SUITE 100
CHICAGO, IL 60607

NO.	DESCRIPTION	BY	DATE
7			
6			
5			
4			
3			
2	PER CDDT	AJK	8-20-01
1	PER CDDT	WPN	7-25-01
0			

hbK ENGINEERING, LLC
921 W. VAN BUREN STREET
SUITE 100
CHICAGO, IL 60607

hbK ENGINEERING
ENGINEER

(312) 432-0076 FAX: (312) 432-0231
STATE OF ILLINOIS, DEPARTMENT OF PROFESSIONAL REGULATION. LICENSE NO. 184-002308

Global Crossing
OWNER/DEVELOPER

101 NORTH WACKER DRIVE, SUITE 230
CHICAGO, IL 60606
(708) 867-3913
REGISTRATION NO. 14982

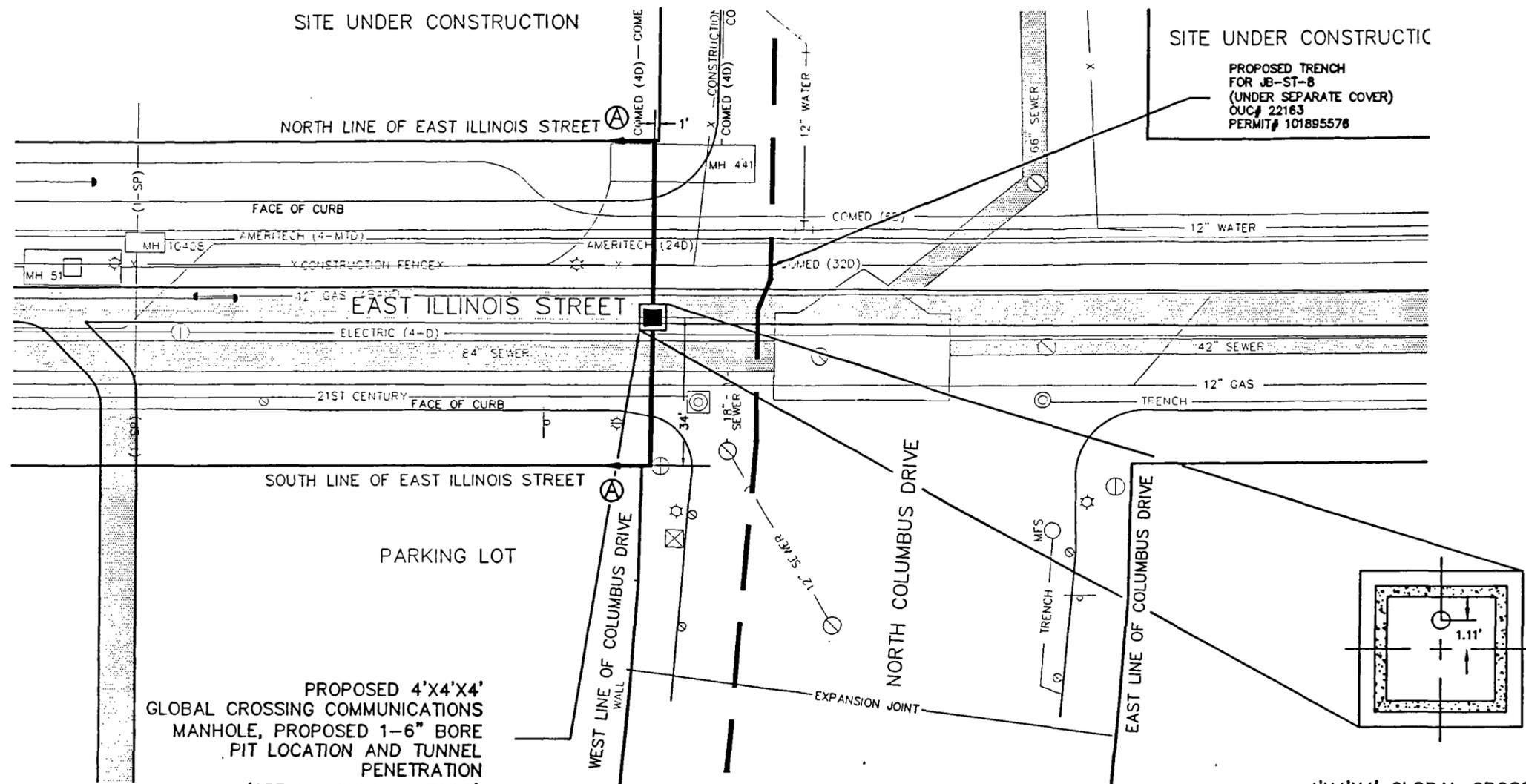
John burns
construction company
CONTRACTOR

P.O. BOX 827
ORLAND PARK, IL 60462-0827
TEL: (708) 479-2143
FAX: (708) 479-4956

FILE NUMBER: 0111TB1
ENGINEER(S): JRJ, WPN
DATE: 5-15-01
SCALE: N.T.S.
SHEET: 1 OF 8

PROJECT: CHICAGO FREIGHT TUNNEL PENETRATION - GLOBAL CROSSING, ILLINOIS STREET AND COLUMBUS DRIVE, CHICAGO, ILLINOIS - "GC-TB-1"

James R. Jackson, Jr.
 JAMES R. JACKSON, JR., P.E.



PROPOSED 4'X4'X4'
 GLOBAL CROSSING COMMUNICATIONS
 MANHOLE, PROPOSED 1-6" BORE
 PIT LOCATION AND TUNNEL
 PENETRATION
 (SEE STANDARD DETAILS)

4'X4'X4' GLOBAL CROSSING
 COMMUNICATION MANHOLE
 AND 1-6" BORE AS
 LOCATED IN BOTTOM OF PIT.
 SCALE: 1" = 5'

NOTES:

THE UNDERGROUND UTILITY LOCATIONS SHOWN ON THIS PLAN WERE DERIVED FROM DRAWINGS PROVIDED BY THE CHICAGO DEPARTMENT OF TRANSPORTATION - OFFICE OF UNDERGROUND'S UTILITY SEARCH PROCEDURE. EXISTING FACILITY LOCATIONS ARE APPROXIMATE AND MUST BE FIELD VERIFIED PRIOR TO CONSTRUCTION. "DIGGER" IS TO BE NOTIFIED 48 HOURS PRIOR TO THE START OF ANY WORK ON THIS PROJECT. (312-744-7000)

CITY OF CHICAGO - DEPARTMENT OF SEWERS IS TO BE NOTIFIED PRIOR 48 HOURS TO THE START OF CONSTRUCTION AT (312) 747-7047.

AN EIGHTEEN (18) INCH MINIMUM VERTICAL SEPARATION AND A THREE (3) FOOT MINIMUM HORIZONTAL SEPARATION MUST BE MAINTAINED BETWEEN ALL PROPOSED CONDUIT INSTALLATIONS AND ALL EXISTING WATER MAINS.

RESTORATION TO BE IN COMPLIANCE WITH DEPARTMENT OF TRANSPORTATION STANDARDS.

CONTRACTOR IS CAUTIONED TO PROTECT SEWER MANHOLES, CATCH BASINS, LATERALS AND INLETS. A FOUR (4) FOOT MINIMUM HORIZONTAL SEPARATION AND A TWO (2) FOOT MINIMUM VERTICAL SEPARATION MUST BE MAINTAINED BETWEEN ALL PROPOSED CONDUIT INSTALLATIONS AND EXISTING SEWER MANHOLES, CATCH BASINS, LATERALS AND INLETS.

CONTRACTOR WILL PROVIDE BARRICADING TO INSURE CORRECT TRAFFIC CONTROL PER THE CHICAGO DEPARTMENT OF TRANSPORTATION, REGULATIONS FOR OPENINGS, CONSTRUCTION AND REPAIR IN THE PUBLIC WAY WHILE MAINTAINING VEHICULAR TRAFFIC AT ALL TIMES.

THE EXISTING ABOVE GROUND UTILITY STRUCTURES AND IMPROVEMENTS SHOWN ON THESE DRAWINGS WERE FIELD LOCATED BY COMPASS, LTD LAND SURVEYING & MAPPING, UTILIZING CONVENTIONAL (TOTAL STATION) DATA COLLECTION METHODS, DURING THE WEEK OF DECEMBER 8TH, 2000.

NO.	DESCRIPTION	BY	DATE
7			
6			
5			
4			
3			
2			
1			
0			

hbk ENGINEERING
 ENGINEER

HBK ENGINEERING, LLC
 940 WEST ADAMS
 SUITE 403
 CHICAGO, IL 60607

(312) 432-0076 FAX: (312) 432-0231
 STATE OF ILLINOIS, DEPARTMENT OF PROFESSIONAL REGULATION. LICENSE NO. 184-002308

Global Crossing
 OWNER/DEVELOPER

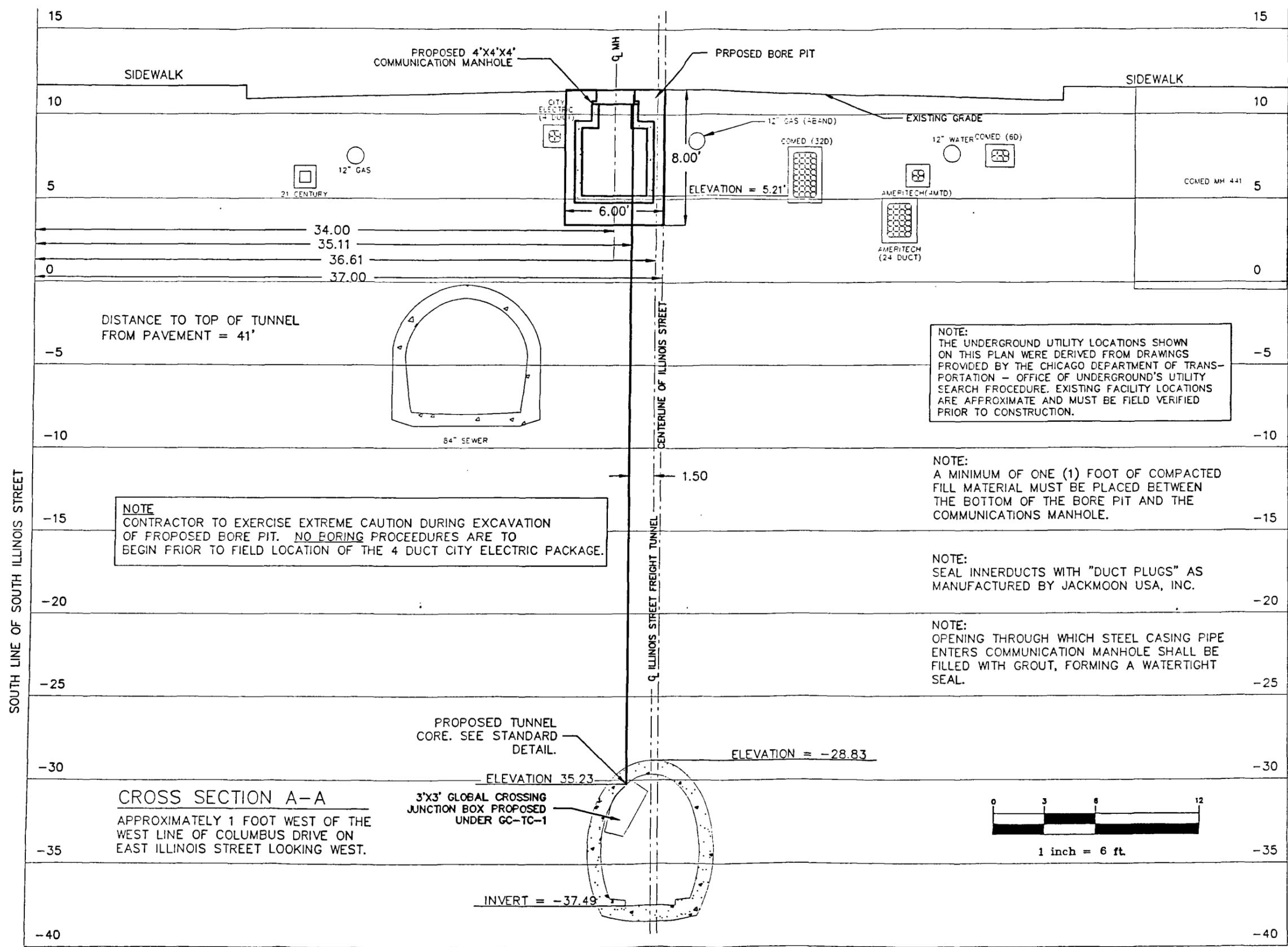
101 NORTH WACKER DRIVE, SUITE 230
 -CHICAGO, IL 60606
 (708) 867-3913
 REGISTRATION NO. 14982

john burns construction company
 CONTRACTOR

FILE NUMBER	0111TB1
ENGINEER(S)	JRJ, WPN
DATE	5-15-01
SCALE	1" = 30'
PAGE	5 OF 8

PROJECT: CHICAGO FREIGHT TUNNEL PENETRATION - GLOBAL CROSSING, ILLINOIS STREET AND COLUMBUS DRIVE, CHICAGO, ILLINOIS - 'GC-TB-1'

J.R. Jackson
JAMES R. JACKSON, JR., P.E.



DISTANCE TO TOP OF TUNNEL FROM PAVEMENT = 41'

NOTE
CONTRACTOR TO EXERCISE EXTREME CAUTION DURING EXCAVATION OF PROPOSED BORE PIT. NO BORING PROCEDURES ARE TO BEGIN PRIOR TO FIELD LOCATION OF THE 4 DUCT CITY ELECTRIC PACKAGE.

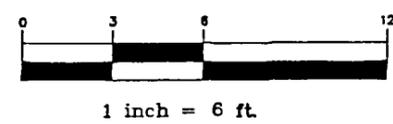
NOTE:
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NOTE:
A MINIMUM OF ONE (1) FOOT OF COMPACTED FILL MATERIAL MUST BE PLACED BETWEEN THE BOTTOM OF THE BORE PIT AND THE COMMUNICATIONS MANHOLE.

NOTE:
SEAL INNERDUCTS WITH "DUCT PLUGS" AS MANUFACTURED BY JACKMOON USA, INC.

NOTE:
OPENING THROUGH WHICH STEEL CASING PIPE ENTERS COMMUNICATION MANHOLE SHALL BE FILLED WITH GROUT, FORMING A WATERTIGHT SEAL.

CROSS SECTION A-A
APPROXIMATELY 1 FOOT WEST OF THE WEST LINE OF COLUMBUS DRIVE ON EAST ILLINOIS STREET LOOKING WEST.



PROJECT: CHICAGO FREIGHT TUNNEL PENETRATION - GLOBAL CROSSING, ILLINOIS STREET AND COLUMBUS DRIVE, CHICAGO, ILLINOIS - 'GC-TB-1'

NO.	DESCRIPTION	BY	DATE
7			
6			
5			
4			
3			
2			
1			
0			

ENGINEER

hbk ENGINEERING, LLC
921 WEST VAN BUREN
SUITE 100
CHICAGO, IL 60607

hbk ENGINEERING

(312) 432-0076 FAX: (312) 432-0231
STATE OF ILLINOIS, DEPARTMENT OF PROFESSIONAL REGULATION, LICENSE NO. 184-002308

OWNER/DEVELOPER

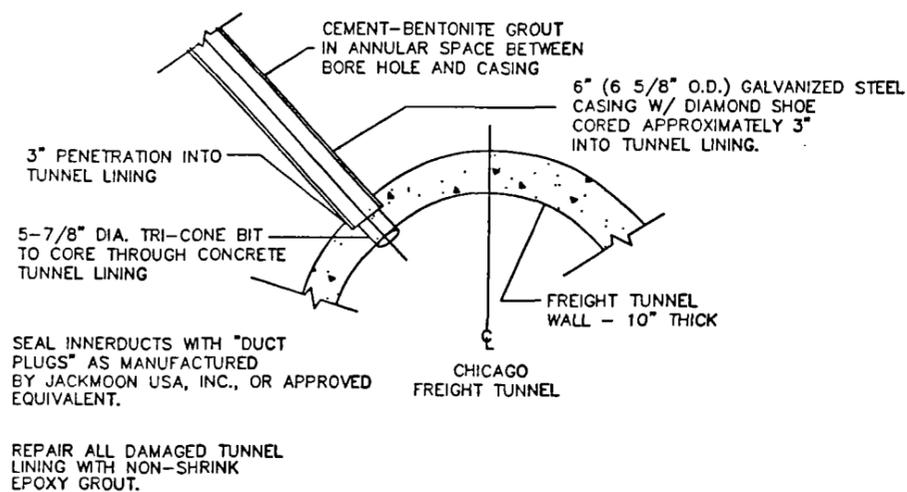
Global Crossing

101 NORTH WACKER DRIVE, SUITE 230
CHICAGO, IL 60606
(708) 867-3913
REGISTRATION NO. 14982

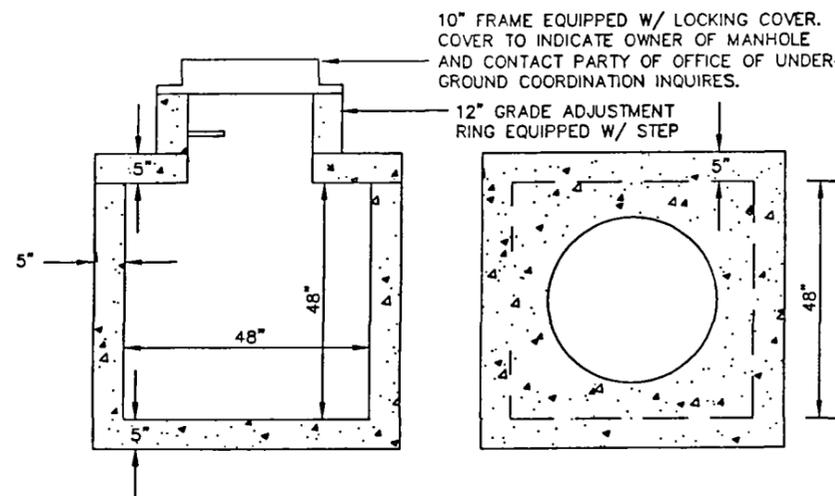
CONTRACTOR

john burns construction company

FILE NUMBER	0111TB1
ENGINEER(S)	JRJ, WPN
DATE	5-15-01
SCALE	1" = 6'
PAGE	6 OF 8



TUNNEL CORE DETAIL



MANHOLE, FRAME AND COVER TO MEET AASHTO HS-20 LOADING REQUIREMENTS.

COMMUNICATION MANHOLE TO BE INSTALLED COMPLETE W/ RACKING PACKAGE AND 5' GALVANIZED STEEL LADDER. LADDER IS TO BE EQUIPPED W/ HOOKS TO ATTACH LADDER TO STEP W/IN ADJUSTMENT RING.

4'X4' COMMUNICATION MANHOLE DETAIL

PROJECT, CHICAGO FREIGHT TUNNEL PENETRATION - GLOBAL CROSSING, ILLINOIS STREET AND COLUMBUS DRIVE, CHICAGO, ILLINOIS - 'GC-TB-1'

NO.	DESCRIPTION	BY	DATE
7			
6			
5			
4			
3			
2			
1			
0			

ENGINEER

hbk ENGINEERING

HBK ENGINEERING, LLC
921 W. VAN BUREN STREET
SUITE 100
CHICAGO, IL 60607

(312) 432-0076 FAX: (312) 432-0231
STATE OF ILLINOIS, DEPARTMENT OF PROFESSIONAL REGULATION, LICENSE NO. 184-002308

OWNER/DEVELOPER

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(708) 867-3913
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CONTRACTOR

john burns construction company

P.O. BOX 827
ORLAND PARK, IL 60462-0827
TEL: (708) 479-2143
FAX: (708) 479-4956

FILE NUMBER:	0111TB1
ENGINEER(S):	JRJ, WPN
DATE:	5-15-01
SCALE:	N.T.S.
SHEET:	8 OF 8

Qwest.

"QW-TB-21"

LEGEND

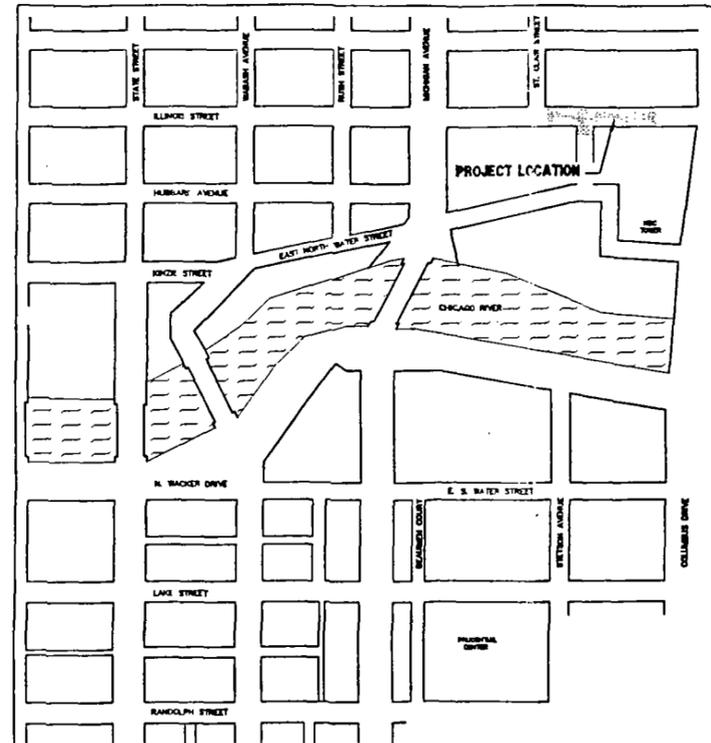
- PROPOSED COMMUNICATION MANHOLE
- EXISTING NEXTLINK MANHOLE
- EXISTING AMERITECH MANHOLE
- EXISTING 21 CENTURY MANHOLE
- EXISTING LEVEL (3) MANHOLE
- EXISTING OPEN LID SEWER
- EXISTING COMED MANHOLE
- EXISTING ELECTRIC MANHOLE
- EXISTING TRAFFIC BOX
- EXISTING CLOSED LID SEWER
- EXISTING WATER VALVE
- EXISTING GAS VALVE
- EXISTING MCI MANHOLE
- EXISTING UNICOM MANHOLE
- EXISTING FIRE HYDRANT
- EXISTING UNKNOWN STRUCTURE
- EXISTING PARKING METER
- EXISTING TRAFFIC LIGHT
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- EXISTING PLANTER
- EXISTING BIKE RACK
- EXISTING SUPPORT/COLUMN
- EXISTING TREE
- ABANDONED CTA TRACKS & CONDUIT
- EXISTING SEWER
- EXISTING WATER MAIN

FIBER OPTIC CONDUIT INSTALLATION CHICAGO FREIGHT TUNNEL BORE ILLINOIS STREET & ST. CLAIR STREET CHICAGO, ILLINOIS

INDEX TO SHEETS

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SITE LOCATION MAP



PROJECT BENCHMARK

CITY OF CHICAGO BENCH MARK NO. 2106: MARK CUT ON CORNER OF STONE WATER TABLE AT NORTHEAST CORNER OF CIVIC THEATRE BUILDING. BENCH MARK IS ON SOUTH LINE OF WASHINGTON STREET AND ON WEST LINE OF WACKER DRIVE, PRODUCED SOUTH AND IS FOUR FEET ABOVE WALK. ELEVATION = 24.96

NOTE:
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ENGINEER'S ESTIMATE OF MATERIALS

- 1-6" DIAMETER TUNNEL BORE
- 1-4'X8'X6' COMMUNICATIONS MANHOLE
- 33' OF 6" DIAMETER STEEL CASING PIPE



EXPIRES 11-30-01

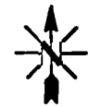
[Signature]
SIGNATURE
6/25/01
DATE

ENGINEER:



HBK ENGINEERING, LLC
921 W. VAN BUREN STREET
SUITE 100
CHICAGO, IL 60607

(312) 432-0076 FAX: (312) 432-0231
STATE OF ILLINOIS, DEPARTMENT OF PROFESSIONAL REGULATION, LICENSE NO. 184-002308



PROJECT: # 21030
HBK# 00-67/QW-TB-21
CIVIC OPERA HOUSE
TO
NBC TOWER
SECTION: 10
TOWNSHIP: 39
RANGE: 14



TITLE: FIBER OPTIC CABLE ROUTE
20 N. WACKER
TO
455 CITY FRONT PL.

REVISIONS		
DATE	DESCRIPTION	INITIAL
04/22/01	PER CDOT	HM

EXCEPT AS MAY BE OTHERWISE PROVIDED BY CONTRACT, THESE DRAWINGS AND SPECIFICATIONS SHALL REMAIN THE PROPERTY OF QWEST NETWORK CONSTRUCTION SERVICES. BOTH BEING ISSUED IN STRICT CONFIDENCE AND SHALL NOT BE REPRODUCED, COPIED, OR USED FOR ANY PURPOSE WITHOUT SPECIFIC WRITTEN PERMISSION.

SCALE
B SIZE DWG: N.T.S.
D SIZE DWG:
DATE: 05-02-01
ENGINEER: JRJ,KEW,HM
MP TO MP
SHEET 1 OF 8
DWG. NO. 0067TB21

CONTRACTOR:



P.O. BOX 827
ORLAND PARK, ILLINOIS 60462-0827
(708) 479-2143 FAX (708) 479-4956
(312) 242-1025

PROJECT PLAN
VIEW



PROJECT: # 21030
 HBK# 00-67/QW-TB-21
 CIVIC OPERA HOUSE
 TO
 NBC TOWER
 SECTION: 10
 TOWNSHIP: 39
 RANGE: 14

john burns
 construction company

hbk
 ENGINEERING
 (312) 432-0078 • FAX: (312) 432-0231
 STATE OF ILLINOIS, DEPARTMENT OF PROFESSIONAL
 REGULATION, LICENSE NO. 184-002308

Qwest.
 Network
 Construction
 Services

TITLE: FIBER OPTIC CABLE ROUTE
 20 N. WACKER
 TO
 455 CITY FRONT PL.

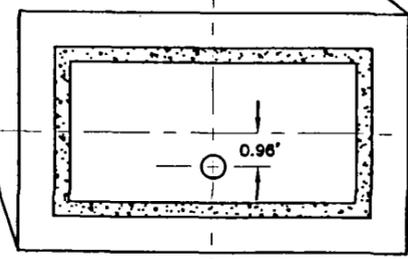
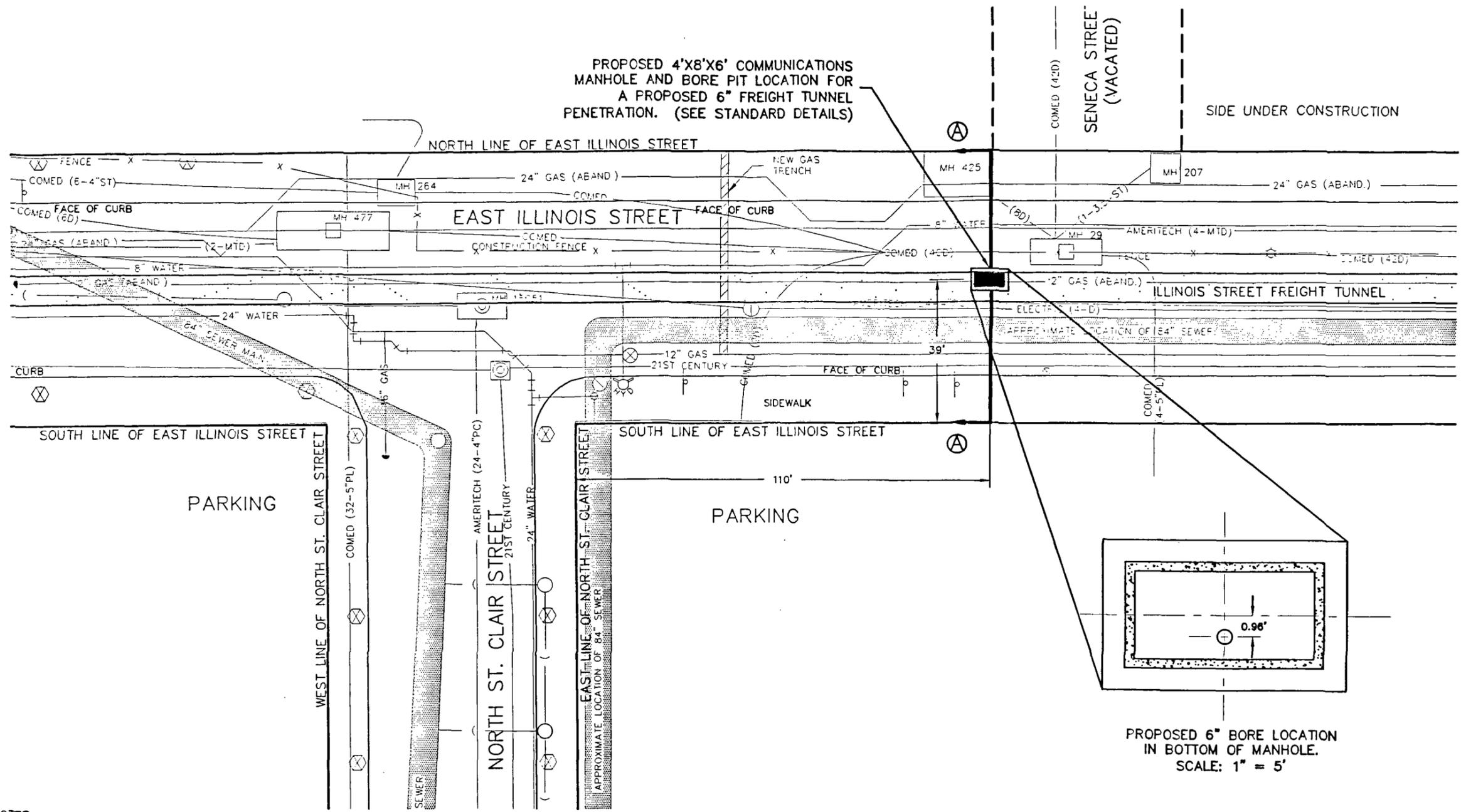
REVISIONS

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SCALE
 B SIZE DWG: 1"=30'
 D SIZE DWG:
 DATE: 05-02-01
 ENGINEER: JRJ,KEW,HM
 MP TO MP
 SHEET 5 OF 8
 DWG. NO. 0067TB21

PROPOSED 4'X8'X6' COMMUNICATIONS
 MANHOLE AND BORE PIT LOCATION FOR
 A PROPOSED 6" FREIGHT TUNNEL
 PENETRATION. (SEE STANDARD DETAILS)



PROPOSED 6" BORE LOCATION
 IN BOTTOM OF MANHOLE.
 SCALE: 1" = 5'

NOTES:

THE UNDERGROUND UTILITY LOCATIONS SHOWN ON THIS PLAN WERE DERIVED FROM DRAWINGS PROVIDED BY THE CHICAGO DEPARTMENT OF TRANSPORTATION - OFFICE OF UNDERGROUND'S UTILITY SEARCH PROCEDURE. EXISTING FACILITY LOCATIONS ARE APPROXIMATE AND MUST BE FIELD VERIFIED PRIOR TO CONSTRUCTION. "DIGGER" IS TO BE NOTIFIED 48 HOURS PRIOR TO THE START OF ANY WORK ON THIS PROJECT. (312-744-7000)

CITY OF CHICAGO - DEPARTMENT OF SEWERS IS TO BE NOTIFIED PRIOR 48 HOURS TO THE START OF CONSTRUCTION AT (312) 747-7047.

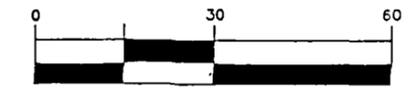
AN EIGHTEEN (18) INCH MINIMUM VERTICAL SEPARATION AND A THREE (3) FOOT MINIMUM HORIZONTAL SEPARATION MUST BE MAINTAINED BETWEEN ALL PROPOSED CONDUIT INSTALLATIONS AND ALL EXISTING WATER MAINS.

RESTORATION TO BE IN COMPLIANCE WITH DEPARTMENT OF TRANSPORTATION STANDARDS.

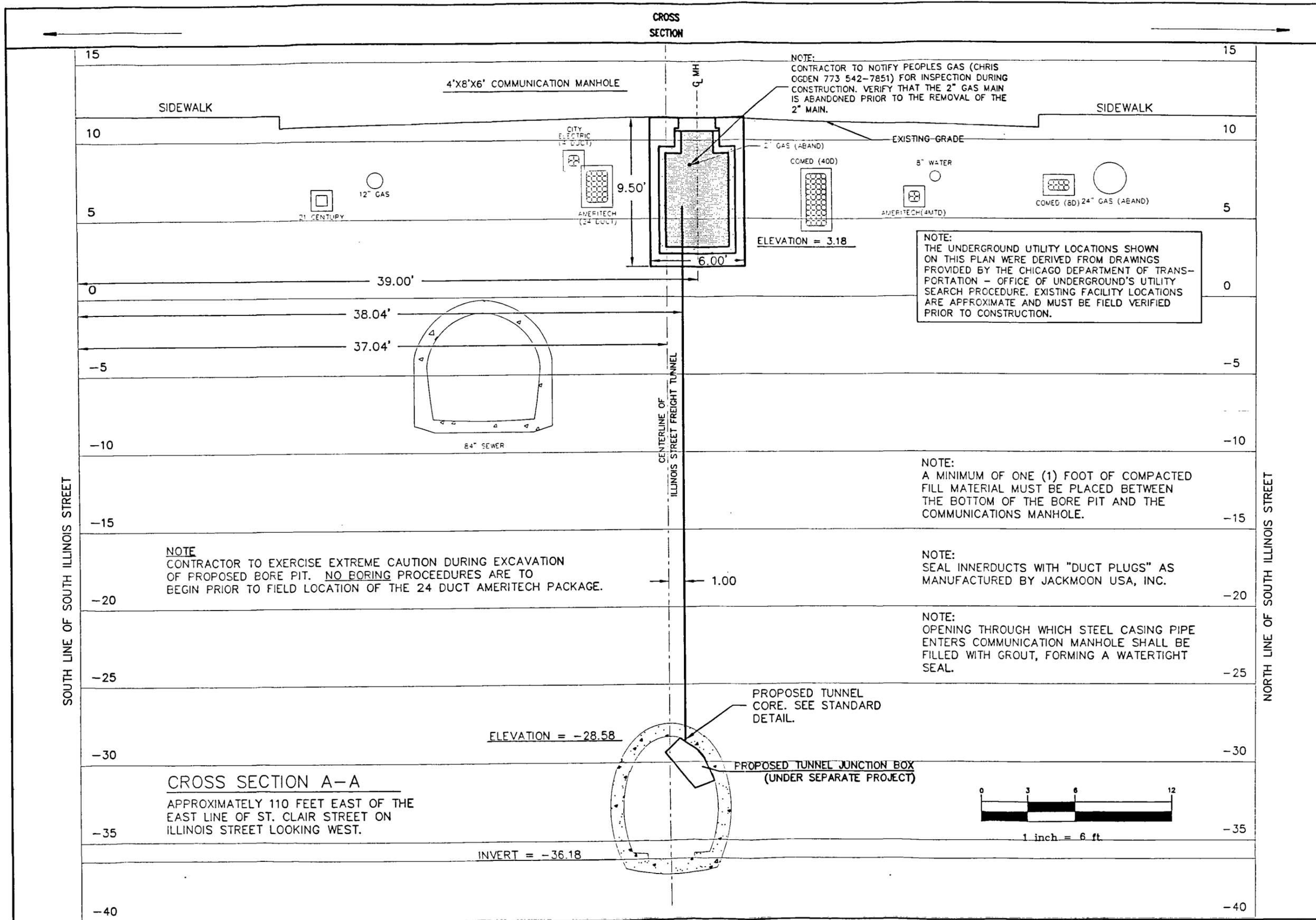
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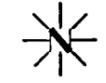
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THE EXISTING ABOVE GROUND UTILITY STRUCTURES AND IMPROVEMENTS SHOWN ON THESE DRAWINGS WERE FIELD LOCATED BY COMPASS, LTD LAND SURVEYING & MAPPING, UTILIZING CONVENTIONAL (TOTAL STATION) DATA COLLECTION METHODS, DURING THE WEEK OF MARCH 26, 2001.



1 inch = 30 ft.





PROJECT: # 21030
 HBK# 00-67/QW-TB-21

CIVIC OPERA HOUSE
 TO
 NBC TOWER

SECTION: 10
 TOWNSHIP: 39
 RANGE: 14

john burns
 construction company

hbk
 ENGINEERING

(312) 432-0076 • FAX: (312) 432-0231
 STATE OF ILLINOIS, DEPARTMENT OF PROFESSIONAL
 REGULATION, LICENSE NO. 184-002308

Qwest.
 Network
 Construction
 Services

TITLE: FIBER OPTIC CABLE ROUTE
 20 N. WACKER
 TO
 455 CITY FRONT PL.

REVISIONS		
DATE	DESCRIPTION	INITIAL

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SCALE

B SIZE DWG: 1"=6'
 D SIZE DWG:

DATE: 05-02-01
 ENGINEER: JRJ,KEW,HM
 MP TO MP
 SHEET 6 OF 8
 DWG. NO. 0067TB21

STANDARD CONSTRUCTION
DETAILS



PROJECT: # 21030
 HBK# 00-67/QW-TB-21
 CIVIC OPERA HOUSE
 TO
 NBC TOWER
 SECTION: 10
 TOWNSHIP: 39
 RANGE: 14

john burns
 construction company

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 ENGINEERING
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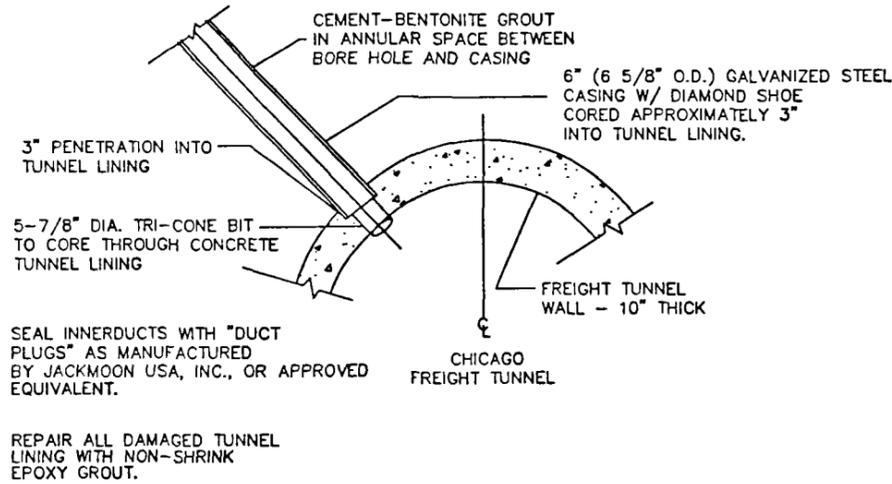
Qwest.
 Network
 Construction
 Services

TITLE: FIBER OPTIC CABLE ROUTE
 20 N. WACKER
 TO
 455 CITY FRONT PL.

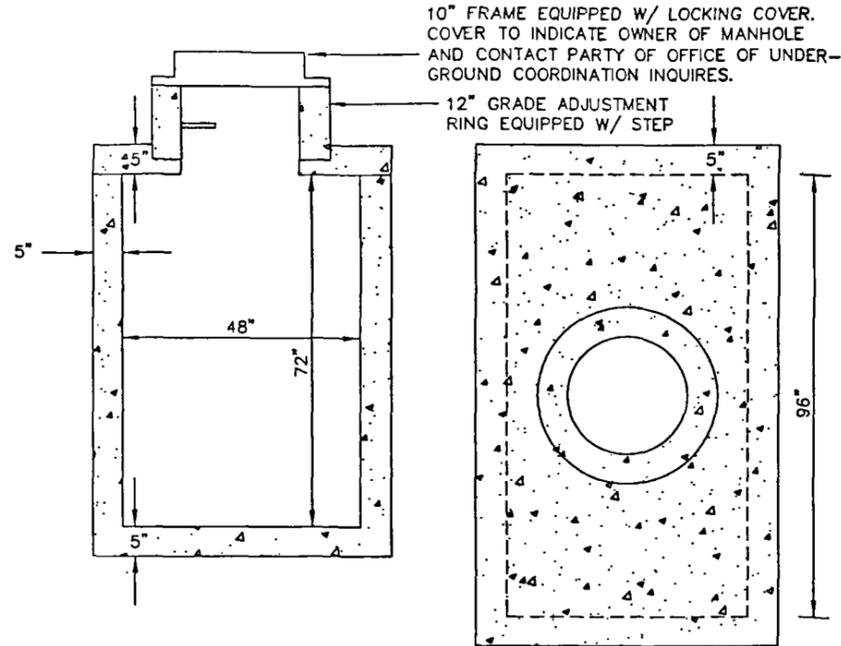
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04/22/04	PER CDOT	HM

EXCEPT AS MAY BE OTHERWISE PROVIDED BY CONTRACT, THESE DRAWINGS AND SPECIFICATIONS SHALL REMAIN THE PROPERTY OF QWEST NETWORK CONSTRUCTION SERVICES. BC-TM BEING ISSUED IN STRICT CONFIDENCE AND SHALL NOT BE REPRODUCED, COPIED, OR USED FOR ANY PURPOSE WITHOUT SPECIFIC WRITTEN PERMISSION.

SCALE
 B SIZE DWG: N.T.S.
 D SIZE DWG:
 DATE: 05-02-01
 ENGINEER: JRJ,KEW,HM
 MP TO MP
 SHEET 8 OF 8
 DWG. NO. 0067TB21



TUNNEL CORE DETAIL



MANHOLE, FRAME AND COVER TO MEET AASHTO HS-20 LOADING REQUIREMENTS.
 COMMUNICATION MANHOLE TO BE INSTALLED COMPLETE W/ RACKING PACKAGE AND 5' GALVANIZED STEEL LADDER. LADDER IS TO BE EQUIPPED W/ HOOKS TO ATTACH LADDER TO STEP W/IN ADJUSTMENT RING.
4'X8'X6' COMMUNICATION MANHOLE DETAIL

HIGHWAY AUTHORITY AGREEMENT
FOR RIGHTS-OF-WAY ADJACENT TO
RIVER EAST L.L.C.
LINDSAY LIGHT II PROJECT
HEALTH & SAFETY PLAN

Permit Applicant

Date

Permit Applicant
Project Coordinator
Health & Safety Coordinator

Date

EMERGENCY PLAN

In the event excavation within the identified impacted area (Figure 1.1) is required on an emergency basis, the following shall be incorporated to the extent possible, and all personnel working in the potentially impacted areas shall be given the opportunity to read this section of the Health and Safety Plan (HASP). The remainder of the attached HASP will be implemented as conditions allow.

A. PROTECT WORKERS POTENTIALLY EXPOSED TO IMPACTED SOIL

1. Notify workers that levels of radiation above background levels may be present in excavated soil.
2. Avoid ingesting soil.
Avoid inhaling dust from contaminated areas.
Minimize contact with the soil to the extent possible.
Wear protective coveralls or disposable coveralls to facilitate cleanup of workers.
3. Screen excavation for gamma radiation (NaI detector)

B. AVOID SPREAD OF CONTAMINATION

1. Limit erosion transport of excavated soil through use of hay bales, sand bags, temporary berm materials to minimize uncontrolled runoff.
2. Cover any excavation soil piles until screened for potential contamination.
3. Screen soil prior to transport away from project site using NaI gamma detector.

C. MINIMIZE POTENTIAL PUBLIC CONTACT.

1. Limit access to excavated soil using barricades, temporary fencing, jersey barriers.
2. Cover excavated piles to minimize fugitive dust. Wet dusty excavations.
3. Control, to the extent possible, off-site tracking by vehicles, potentially contaminated boots or clothing by workers.

D. MONITOR CONTAMINATION

1. To the extent practicable, provide gamma radiation screening of the exposed soils in the excavation (NaI detector).
2. When possible, provide high volume air samplers immediately adjacent to potential or known exposed contaminated soil, to monitor for fugitive emissions (dust, radon gas).
3. Survey ground surface/pavement surface around potential or known contamination locations for elevated gamma radiation (NaI detector).

E. NOTIFY AUTHORITIES

Notify agencies identified on the enclosed emergency notification list.

<u>USEPA</u>	<u>312-353-2318</u>	
<u>IDNS</u>	<u>217-785-0600</u>	(Illinois Department of Nuclear Safety)
<u>Chicago D.E.</u>	<u>312-744-7672</u>	(Chicago Department of the Environment)
<u>IEMA</u>	<u>217-782-7860</u>	(Illinois Emergency Management Agency)

Notification should include, as a minimum, the following

- Location of Excavation
- Potential Contact with Thorium Containing Soil (11.e.2 source material)
- Field surveys and sampling measured a maximum total radium (Ra226 + Ra228) concentration of 600 $\mu\text{Ci}/\text{g}$ in soil remaining, although higher concentrations may be present.

The following support services should be secured:

- Gamma radiation survey equipment (micro-R meter, NaI detector) should be secured promptly for site screening.
- Health Physics contractors, personnel and monitoring equipment should be secured promptly to provide survey and monitoring services in accordance with the attached plan.

APPENDIX A

PERSONNEL QUALIFICATIONS

The following are minimum qualifications for project personnel.

Project Coordinator:

- OSHA 40-hour health and safety training
- 8-hour supervisory training
- 4-hour radiation hazard training
- Responsible for work order implementation
- Familiar with this HASP

Field Team Leader:

- OSHA 40-hour health and safety training
- 4-hour radiation hazard training
- Responsible for tailgate safety meetings
- Familiar with this HASP

Health Physics Personnel (under direct supervision of a CHP):

- OSHA 40-hour health and safety training
- Familiar with this HASP
- Responsible for dosimeter/personnel monitoring in accordance with Section 4.3.2 of this HASP

Health and Safety Coordinator:

- OSHA 40-hour health and safety training
- 8-hour supervisor training
- 4-hour radiation hazard training
- Familiar with this HASP
- Authorized to enforce provisions of this HASP

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Appendix A. Personnel Qualifications

→ is in front of the document
not the back.

EMERGENCY PHONE NUMBERS

IN THE EVENT OF AN EMERGENCY DIAL: 911

AMBULANCE SERVICE911
FIRE DEPARTMENT911
EMERGENCY RESCUE SERVICE911
POLICE DEPARTMENT.....911
NATIONAL RESPONSE CENTER.....1-800-424-8802

POISON CONTROL CENTER1-800-732-2200
NORTHWESTERN MEMORIAL HOSPITAL.....(312) 908-2000
ILLINOIS DEPARTMENT OF NUCLEAR SAFETY
(IDNS) EMERGENCY NUMBER(217) 785-0600

PERMIT APPLICANT
ILLINOIS EMERGENCY MANAGEMENT(217) 782-7860
U.S. EPA REGION V 24-HOUR EMERGENCY(312) 353-2318
NUMBER

1. SCOPE OF PLAN

1.1 Work of Plan

The following Health and Safety Plan (HASP) will be utilized and modified as necessary in order to minimize and prevent exposures to hazardous substances and conditions related to excavation in public rights-of-way adjacent to the Lindsay Light II site. These rights-of-way and identified impacted areas are shown on Figure 1.1, and are referred to herein as the Site.

All personnel assigned to work at the Site will be required to review the contents of this HASP and to strictly adhere to the policies and procedures listed herein. This HASP is for use only by the Permit Applicants, their designated contractors and consultants, and approved Site visitors. USEPA and other agencies are not considered visitors and will be required to conform to their own health and safety plans.

This plan meets the requirements of OSHA 29 CFR 1910.120, Hazardous Waste Operations and Emergency Responses, and applicable subparts of OSHA 29 CFR 1926, 1910, (particularly, 1910.1096 pertaining to ionizing radiation), and 10 CFR, at the time this plan is being prepared (September 1999). The permit applicant should confirm that the proposed actions comply with regulations at the time the proposed actions are to be implemented.

1.2 Background

Thorium contamination of the Lindsay Light II Site resulted from operations related to the storage and processing of thorium-bearing sand. The Lindsay Light II Site was remediated under a Unilateral Administrative Order from the USEPA. Several areas of contamination remained outside the Lindsay Light II Site following the completion of the remediation. These areas exhibit radioactivity at levels above normal background for the area. Measurements were made along the entire excavated limits, with representative readings for the impacted zones shown on Figure 1.1. The levels that might be encountered in excavating could be higher, based on measured levels previously excavated at vicinity locations.

The contaminated soil does not represent a risk as residual contamination in place. However, excavation in the areas exhibiting evidence of residual contamination requires appropriate health and safety procedures to protect workers and the public. These procedures are presented herein. Additionally, any contaminated material removed from the site will require appropriate management and disposal. A separate Work Order as is required for management and disposal of any contaminated excavation soil may be required. USEPA may require review and approval of a Work Order prior to start of work. That Work Order will identify volumes of material to be excavated and disposed, specify permits required for transport and disposal, identify the disposal sites, and specify the clean-up criteria based on the contamination encountered. For Lindsay Light II Site, the clean-up threshold for thorium impacted soil was 5 pCi/gm above background, with a background of 2.1 pCi/gm total radium.

The clean-up criteria was 7.1 pCi/gm total radium (Ra226 + Ra228). The waste management plan is not included herein as that will be project specific.

The objective in appropriate management of the contaminated material is to operate the proposed work under exposure levels which are as low as reasonably achievable (ALARA). This concept applies to exposure through ingestion, inhalation, external exposure, internal exposure, on-site or off-site. ALARA concepts should be considered throughout the implementation of the HASP, and the associated work in the impacted areas.

2. SAFETY MANAGEMENT

The following safety management structure will be utilized for the implementation, administration, and monitoring of the HASP.

2.1 HEALTH AND SAFETY COORDINATOR

The Health and Safety Coordinator (HSC) shall assume overall responsibility for the HASP. The HSC or designee shall monitor and maintain quality assurance of the HASP until project completion. Principal duties of the HSC include:

- Review project background data,
- Approve all HASP modifications,
- Administer and enforce the HASP,
- Evaluate the adequacy of personal protective equipment (PPE) to be used by Site personnel,
- Conduct required on-site training except tailgate safety meetings that will be conducted by the Field Team Leader,
- Brief visitors on work Site conditions, and
- Administer personnel and ambient air monitoring procedures.

The HSC or designee has the authority to stop work in the event conditions develop which pose an unreasonable risk to Site personnel or persons in the vicinity.

Appendix A presents qualifications for project personnel.

3. PERSONNEL RESPONSIBILITIES

The HSC or designee will administer and supervise the HASP at the work-site level. He will monitor all operations and will be the primary on-site contact for health and safety issues, and will have full authority to stop operations if conditions are judged to be hazardous to on-site personnel or the public.

The HSC will brief all Site personnel on the contents of the HASP. Personnel will be required to review the HASP, and have the opportunity to ask questions about the planned work or hazards. The Field Team Leader will conduct tailgate safety meetings to familiarize the Site personnel with Site conditions, boundaries, and physical hazards. Site personnel will conduct their assigned tasks in accordance with the HASP at all times.

If at any time Site personnel observe unsafe conditions, faulty equipment or other conditions which could jeopardize personnel health and safety, they are required to immediately report their observations to the HSC or Field Team Leader.

Work zones will be established at the Site. These zones include clean/support zones, decontamination zones, and exclusion zones. Although the clean/support zones are anticipated to remain fixed, other zones will move about the Site as work progresses. Figure 1.1 shows the impacted areas where exclusion zones may be established during excavation activities.

4. HAZARD ASSESSMENT

The following represents potential hazards associated with this project.

4.1 PRINCIPAL CONTAMINANTS (KNOWN OR SUSPECTED)

- Thorium
- Uranium
- Radium
- Radon

The contaminants are present in the soil at low concentrations. These primary routes of entry to the body will be considered:

<u>ROUTE</u>	<u>ENTRY MADE VIA:</u>
Inhalation:	Airborne dust containing heavy metal radionuclides, and radon gases
Ingestion:	Airborne dust containing heavy metal radionuclides/contaminants. Improper or poor personal hygiene practices.
Eye and Skin:	Direct contact with contaminants. Improper or poor personal hygiene practices. Airborne dust containing heavy metal/radionuclide contaminant. Cuts and abrasions.
Direct Exposure:	Penetrating gamma radiation in air and soil.

4.2 PHYSICAL HAZARDS

Before field activities begin, the HSC will conduct a Site reconnaissance to identify any real or potential hazards created from Site activities. Physical hazards inherent to construction activities and power-operated equipment may exist.

4.2.1 Heat Stress

Field activities in hot weather create a potential for heat stress. The warning symptoms of heat stress include fatigue; loss of strength; reduced accuracy, comprehension and retention; and reduced alertness and mental capacity. To prevent heat stress, personnel shall receive adequate water supplies and electrolyte replacement fluids, and maintain scheduled work/rest periods.

The Field Team Leader or designee shall continuously visually monitor personnel to note for signs of heat stress. In addition, field personnel will be instructed to observe for symptoms of heat stress and methods on how to control it. One or more of the following control measures can be used to help control heat stress.

- *Provision of adequate liquids to replace lost body fluids.* Employees must replace body fluids lost from sweating. Employees must be encouraged to drink more than the amount required to satisfy thirst, 12 to 16 ounces every half hour is recommended. Thirst satisfaction is not an accurate indicator of adequate salt and fluid replacement. Replacement fluids can be commercial mixes such as Gatorade.
- Establishment of a work regimen that will provide adequate rest periods for cooling down. This may require additional shifts of workers.
- Breaks should be taken in a cool and shaded rest area (77 degrees is best).
- Employees shall remove impermeable protective garments during rest periods.
- Employees shall not be assigned other tasks during rest periods.
- All employees shall be informed of the importance of adequate rest, acclimation, and proper diet in the prevention of heat stress.

4.2.2 Cold Stress

If the field activities occur during a period when temperatures average below freezing, the following guidelines will be followed.

Persons working outdoors in temperatures of 40 degrees and below may suffer from cold exposure. During prolonged outdoor periods with inadequate clothing, effects of cold exposure may even occur at temperatures well above freezing. Cold exposure may cause severe injury by freezing exposed body surfaces (frostbite) or result in profound generalized cooling, possibly causing death. Areas of the body which have

high surface area-to-volume ratios such as fingers, toes and ears are the most susceptible to frostbite.

Two factors influence the development of a cold injury: ambient temperature and the velocity of the wind. Wind chill is used to describe the chilling effect of moving air in combination with low temperature. For instance, 10° F with a wind of 15 miles per hour (mph) is equivalent in chilling effect to still air at -18°F.

As a general rule, the greatest incremental increase in wind chill occurs when a wind of 5 mph increases to 10 mph. Additionally, water conducts heat 240 times faster than air. Thus, the body cools suddenly when external chemical-protective equipment is removed if the clothing underneath is perspiration-soaked.

Local injury resulting from cold is included in the generic term "frostbite". There are several degrees of damage. Frostbite of the extremities can be categorized into:

- Frost nip or incipient frostbite: Characterized by sudden blanching or whitening of skin.
- Superficial frostbite: Skin has a waxy or white appearance and is firm to the touch, but tissue beneath is resilient.
- Deep frostbite: Tissues are cold, pale, and solid; extremely serious injury.

Prevention of frostbite is vital. Keep the extremities warm. Wear insulated clothing as part of one's protective gear during extremely cold conditions. Check for symptoms of frostbite at every break. The onset is painless and gradual--you might not know you have been injured until it is too late.

To administer first aid for frostbite, bring the victim indoors and rewarm the areas quickly in water 95° to 100°F. Give individual a warm drink--not coffee, tea, or alcohol. The victim should not smoke. Keep the frozen parts in warm water or covered with warm clothes for 30 minutes, even though the tissue will be very painful as it thaws; then elevate the injured area and protect it from injury. Do not allow blisters to be broken. Use sterile, soft, dry material to cover the injured areas. Keep victim warm and get immediate medical care.

4.2.3 Electrical Hazards

Overhead power lines, downed electrical wires, buried cables and improper use of electrical extension cords can pose a danger of shock or electrocution. All Site personnel should immediately report to the Field Team Leader any condition that could result in a potential electrical hazard.

The Field Team Leader will notify Site personnel during the safety meetings of the locations of known underground cables and utilities.

4.2.4 Noise Hazard

Operation of equipment may present a noise hazard to workers. Site personnel will utilize hearing protection when noise levels are determined to be in excess of 29 CFR 1910.95 requirements. Noise monitoring will be performed to determine noise levels.

4.2.5 Overt Chemical Exposure

4.2.5.1 Non-Radioactive Exposure

Typical response procedures include:

SKIN CONTACT: Use copious amounts of soap and water. Wash/rinse affected area thoroughly, then provide appropriate medical attention. Eye wash will be provided on-site at the work zone and support zone as appropriate. If affected, eyes should be continuously flushed for a minimum of 15 minutes.

INHALATION: Move to fresh air and transport to hospital. Decontaminate as other actions permit.

INGESTION: Transport to emergency medical facility. Decontaminate as permitted by other requirements.

PUNCTURE WOUND OR LACERATIONS: Transport to emergency medical facility. Field Team Leader will provide Material Safety Data Sheets (MSDS) to medical personnel as requested. Decontaminate as permitted by other requirements.

4.2.5.2 Radioactive Exposure

The contamination materials are soil and debris which can reasonably be removed through the decontamination procedure in Section 9.0. Residual concentrations are not sufficient to produce an acute effect requiring emergency response.

4.2.6 Adverse Weather Conditions

In the event of adverse weather conditions, the Field Team Leader will determine if work can continue without endangering the health and safety of field workers. Some items to be considered before determining if work should continue are:

Potential for heat stress and heat-related injuries.

Potential for cold stress and cold-related injuries.

Treacherous weather-related working conditions.

Limited visibility.

Potential for electrical storms or high winds.

4.3 MEDICAL EVALUATION AND SURVEILLANCE PROGRAM

All field project personnel shall receive a medical evaluation in accordance with 29 CFR 1910.120 and Appendix A. Personnel who receive a medical evaluation will be notified by the medical contractor as to the outcome of their evaluation. This will be in the form of a confidential report addressed to the individual and will contain a breakdown of the clinical findings. In addition, it will indicate any areas of concern which would justify further medical consultation by the individual's personal physician. In the event that the areas of concern are of a severe nature, a follow-up notification will be made to the individual by the medical consultant to answer any questions the employee may have.

4.3.1 Dosimetry/Personnel Monitoring

All project personnel shall participate in a dosimetry program administered by the Project Health Physics Personnel. (The dosimetry program shall comply with 32 IAC 340¹, i.e. dosimeters shall be processed by a dosimetry processor accredited by the National Voluntary Laboratory Accreditation Program.) The Project Health Physics Personnel shall maintain records of all radiation exposures incurred by field personnel including all contractors. These records will be maintained in an up-to-date manner to comply with the requirements of 32 IAC 340.4010. The HSC shall review the results of personal exposure monitoring to determine compliance with exposure limit requirements. (Personnel qualifications for health physics personnel are included in Appendix A.)

4.3.2 Requirement for Dosimetry

Personal dosimetry is required for anyone who enters a radiologically controlled area in which he/she may receive in one calendar year a dose in excess of 10% of the limits in 32 IAC 340. Any person who works in a radiation area will be required to have a personal dosimeter. As a matter of policy, all individuals shall be required to use a dosimeter (either self-reading type, film badge or Thermoluminescence Detector (TLD)) whenever they enter the Exclusion Zone.

4.3.3 Bioassay

Bioassay is the determination of the types and amounts of radioactive materials which are inside the body. By analyzing the rate of deposition, the rate of excretion, and any other available information regarding placement in the body, internal exposures from radioactive materials can be estimated.

..... Bioassays are not anticipated to be required for the excavation and removal activities proposed, based on levels documented as present. The determination of the need for bioassay will be based on dosimetry monitoring and review and recommendations from the Project Health Physics personnel.

¹ The IDNS regulations are usually more restrictive than US Nuclear Regulatory Commission (NRC) regulations. However, if there is a conflict between IDNS and NRC regulations, the NRC regulations will be used to determine compliance.

4.3.4 Emergency Medical Treatment

Emergency first aid should be administered on-site as appropriate. The individual should be decontaminated if possible, depending on the severity of the injury, and transported to the nearest medical facility, if needed. Treatment of the injury is of primary concern and decontamination a secondary concern. Levels of radioactive contamination at the Site could be acutely hazardous if decontamination is not undertaken during an emergency situation. The Field Team Leader will complete the appropriate incident report, if warranted. See Section 4.4, Accident and Incident Reporting.

An emergency first-aid station will be established and will include a first-aid kit for on-site emergency first aid.

Provisions for emergency medical treatment shall be integrated with the following guidelines:

- At least one individual qualified to render first aid and Cardiopulmonary Resuscitation (CPR) will be assigned to each shift.
- Emergency first aid stations in the immediate work vicinity.
- Conspicuously posted phone numbers and procedures for contacting ambulance services, fire department, police, and medical facilities.
- Maps and directions to medical facilities.
- Conspicuously posted evacuation routes and gathering area locations shall be posted around the Site.

4.4 ACCIDENT AND INCIDENT REPORTING

All accidents, injuries, or incidents will be reported to the HSC. This accident/incident will be reported as soon as possible to the employee's supervisor. An Accident/Incident Form will be completed by the Field Team Leader, and a copy will be forwarded to the Project Manager. A copy of the form is shown as Figure 4.1.

Figure 4.1

Accident/Exposure Investigation Report (Page 2 of 3)

Accident/Exposure Investigation Report			
Accident Description			
Date & Time		Location	
Employees Involved			
Preventive Action Recommendations			
—Employee Lost Time—Temporary Help—Cleanup—Repair—Discussion—			
Accident Cost Analysis	Investigation	Compliance	Total Cost
Medical			
Production Loss			
Report Prepared By		Date Completed	
Safety Committee Review		No	
Corrective Action		Date Started	
Safety Communication Notice Prepared		Date	
Safety Director Signature			

Make additional copies of this form as needed. (form provided courtesy of Safety Publications of California © 1990)

5. TRAINING

All Site personnel shall be trained and certified in accordance with 29 CFR 1910.120.

5.1 PROJECT- AND SITE-SPECIFIC TRAINING

Prior to project start-up, all assigned personnel shall receive an initial project- and site-specific training session. This training shall include, but not be limited to, the following areas:

- Review of the Health and Safety Plan;
- Review of applicable radiological and physical hazards (including basic radiation principles and construction site hazards);
- PPE levels to be used by Site personnel;
- Site security control;
- Emergency response and evacuation procedures;
- Project communication;
- Required decontamination procedures;
- Prohibited on-site activities;
- Instructions to workers in accordance with 10 CFR 1912; and
- U.S. NRC Regulatory Guide 8.13 and Declared Pregnant Woman Policies (Females).

5.2 VISITOR ORIENTATION

All non-essential personnel and visitors who plan to enter the exclusion zone will be briefed on the HASP requirements and 10 CFR 1912 requirements prior to entry with a trained Site escort. In addition, female visitors will be instructed regarding U.S. NRC Regulatory Guide 8.13 and Declared Pregnant Woman Policies. Visitors will review the Visitor Information Sheet, Figure 5.1.

5.3 SAFETY "TAILGATE" MEETINGS

Before the start of work each day, the Field Team Leader will assemble the Site personnel for a brief safety meeting. The purpose of these meetings will be to discuss

project status, problem areas, conditions, safety concerns, PPE levels and to reiterate HASP requirements. The Field Team Leader will complete a Safety Meeting Report (Figure 5.2) to indicate the contents of the meeting and the attendees.

5.4 FIRST AID

At least one (1) individual, trained and qualified to administer first aid and CPR in accordance with American Red Cross requirements, will be present at the Site.

5.5 SAFE WORK PERMIT

Site workers in special work conditions such as confined space, hot work, trenching, or other physical hazards, must be skilled at such work and trained to recognize these as special work conditions. Confined space is defined by OSHA 1910.146. Section 13 of this HASP contains further information on the confined space program to be followed.

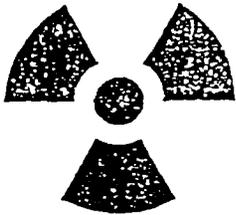
Figure 5.3 shows the Safe Work Permit to be completed by the HSC and signed by workers for special work conditions.

FIGURE 5.1
VISITOR INFORMATION SHEET

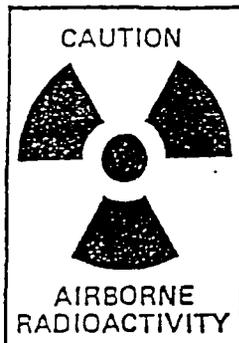
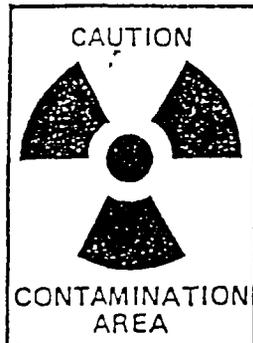
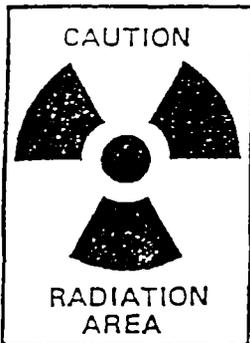
KM-792

VISITOR INFORMATION

NOTICE TO VISITOR: ALL VISITORS MUST BE ESCORTED AT ALL TIMES WHILE ON THIS SITE.



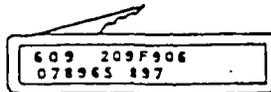
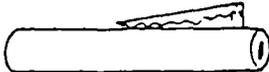
CAUTION. Radioactive materials are present on this site. Radioactive materials may be found throughout the site. Grounds, buildings and equipment have low levels of contamination.



CONTROLLED AREAS: Do not enter areas with these signs unless you have an escort or health physics has given specific approval and you understand access limitations.



You must wear protective clothing in controlled areas. Health physics will provide you with instructions.



You must wear a personal radiation dosimeter if you enter an area which is controlled.



No smoking, eating, drinking or chewing in controlled areas. NO EXCEPTIONS.

You may request to see radioactive materials license for this facility as granted by the USNRC. Notify Health Physics if you do not understand these instructions.

NAME _____ DATE _____

Figure 5.2

Safety Meeting Report (KM-4438-A, front side)

SAFETY MEETING REPORT KM-4438-A			DATE
DIVISION		DEPARTMENT/PLANT	DURATION OF MEETING IS <input type="checkbox"/> A.M. <input type="checkbox"/> P.M. <input type="checkbox"/> P.M. <input type="checkbox"/> P.M.
NUMBER PRESENT	NUMBER ABSENT	MEETING CONDUCTED BY	DID MEETING PRESENCE REQUIRE TRAINING? <input type="checkbox"/> YES (DESCRIBE BELOW*) <input type="checkbox"/> NO
* SUPERVISOR'S PRESENTATION	DISCUSSION OF SAFETY/SAFE WORK PRACTICES, MATERIALS, JOB PRECAUTIONS, HAZARDS, EQUIPMENT FAMILIARIZATION, ETC.		
EMPLOYEE FEEDBACK	COMMENTS, QUESTIONS, COMPLAINTS, ETC.		
SUPERVISOR'S CORRECTIVE ACTION PLAN	KNOWN PLANS FOR CORRECTIVE ACTION, PARTS ON ORDER, ITEMS TO BE DISCARDED WITH DEPT. HEAD, AND CORRECTION OF ITEMS PREVIOUSLY SUBMITTED		
DEPARTMENT HEAD COMMENTS	RESOLUTION OF QUESTIONS, ITEMS OR ISSUES RAISED IN MEETING OR WITH SUPERVISOR		
SUPERVISOR		DEPARTMENT HEAD	
FACILITY MANAGER			

Have employees attending sign on reverse side.
Forward a copy to the local Safety Department.

Figure 5.3

Safe Work Permit (KM-2565-1-B, upper section of front side)

SAFE WORK PERMIT KM-2565-1-B

SHADED AREAS MUST BE COMPLETED.

COMPLETED PERMIT MUST BE POSTED AT THE ENTRY OR WORK SITE.

PLANT/DEPARTMENT	ISSUED BY	DATE	TIME (FROM)	<input type="checkbox"/> A.M. <input type="checkbox"/> P.M.	(TC)
ACCEPTED BY			COMPANY/DEPARTMENT/CONTRACTOR		
RESPONSIBILITY TRANSFERRED TO (NAME)			CO-SIGNATURE (IF REQUIRED)		
LIST ALL WORKERS OR ATTACH ROSTER (OVER)			IS WORK AREA OSHA PSM REGULATED? <input type="checkbox"/> Yes <input type="checkbox"/> No		

AN ALERT, GAS RELEASE, EVACUATION, INTERRUPTION OF 8 HOURS OR MORE OR CHANGE IN WORKING CONDITIONS SUSPENDS THIS PERMIT. (Permit must be reissued or reauthorized)

SECTION 1 GENERAL AREA WORK PERMIT	1. WORK LIMITED TO THE FOLLOWING: (DESCRIPTION & AREA/EQUIPMENT)			
	2. ON-SITE INSPECTION CONDUCTED/ALL LOCKS OR TAGS ATTACHED, IF REQUIRED/ENVIRONMENTAL IMPACT OF JOB CONSIDERED			PERMIT ISSUER INITIALS
	3. SPECIAL HAZARDS TO PROTECT AGAINST <input type="checkbox"/> NONE MSDS AVAILABLE <input type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> N/A			
	CHEMICALS (NAME)			
	<input type="checkbox"/> Flammable	<input type="checkbox"/> Noise	<input type="checkbox"/> Hot Water/Steam	<input type="checkbox"/> Thermal Burn
	<input type="checkbox"/> Toxic	<input type="checkbox"/> Corrosive	<input type="checkbox"/> Heat Stress	<input type="checkbox"/> Elec/High Vltg. Line
	<input type="checkbox"/> Skin Contact	<input type="checkbox"/> Reactive	<input type="checkbox"/> High Pressure	<input type="checkbox"/> Inert Atmosphere
	<input type="checkbox"/> Falls	<input type="checkbox"/> Pinch Pts./Spr. Edges	<input type="checkbox"/> Electrical	<input type="checkbox"/> Hydraulic/Pneumatic
	<input type="checkbox"/> Other	<input type="checkbox"/> Other	<input type="checkbox"/> Other (magnitude)	
	4. SAFETY EQUIPMENT (OTHER THAN AREA REQUIREMENTS) <input type="checkbox"/> NONE			
<input type="checkbox"/> Rain Suit	<input type="checkbox"/> Gloves	<input type="checkbox"/> Face Shield	<input type="checkbox"/> Ground Fault Circuit Int.	
<input type="checkbox"/> Chemical Suit	<input type="checkbox"/> Hearing Protection	<input type="checkbox"/> Hood	<input type="checkbox"/> Air Pack (SCBA)	
<input type="checkbox"/> Rubber Boots	<input type="checkbox"/> Chemical Goggles	<input type="checkbox"/> Fall Restraint Device	<input type="checkbox"/> Fire Resistant	
<input type="checkbox"/> Barricades/Warning Signs	<input type="checkbox"/> Supplied Air	<input type="checkbox"/> Long Sleeves	<input type="checkbox"/> Other	
5. THE PERSON RECEIVING THE PERMIT VERIFIES THAT ALL WORKERS :				
A. Have been through the Plant Safety Orientation	<input type="checkbox"/> Yes	F. Know emergency alarms, evacuation, assembly points	<input type="checkbox"/> Yes	
B. Understand Applicable HAZCOM requirements	<input type="checkbox"/> Yes	G. Know the Procedures for Safe Job Completion	<input type="checkbox"/> Yes	
C. Have discussed hazards of the job and area	<input type="checkbox"/> Yes	H. Have inspected all tools/equipment/scaffolding	<input type="checkbox"/> Yes	
D. Know the location/use of safety showers/eye wash stations	<input type="checkbox"/> Yes	I. Understand the Housekeeping Requirements	<input type="checkbox"/> Yes	
E. Know the location of the phone or intercom	<input type="checkbox"/> Yes	PERMIT RECEIVER INITIALS		
6. POTENTIALLY AFFECTED AREA PERSONNEL AND WORKERS NOTIFIED OF WORK TO BE DONE <input type="checkbox"/> YES <input type="checkbox"/> N/A				
7. THE FOLLOWING RESPONSIBILITIES HAVE BEEN COMMUNICATED TO THE PERSON RECEIVING THIS PERMIT:				
<input type="checkbox"/> Conditions For Work Stoppage	<input type="checkbox"/> Performing The Work Safely	<input type="checkbox"/> Completion Of Section 8 And Permit R		
<input type="checkbox"/> Crew Accountability	<input type="checkbox"/> Reporting Changes That Affect Job Safety			

SECTION 2 AIR TESTS	PRIOR TO ENTRY OR HOT WORK <input type="checkbox"/> DOES NOT APPLY	TEST IN ORDER INDICATED						
		1. Oxygen meter test performed	<input type="checkbox"/> Yes <input type="checkbox"/> N/A	READING	RANGE	TESTED BY	LOCATION OF TEST	TIME
		2. Combustible gases and vapors test	<input type="checkbox"/> Yes <input type="checkbox"/> N/A	READING	MAXIMUM	TESTED BY	LOCATION OF TEST	TIME
		3. Tests for toxics	<input type="checkbox"/> Yes <input type="checkbox"/> N/A	READING	PPM PEL/TLV	TESTED BY	LOCATION OF TEST	TIME

SECTION 3 OBSERVATION & RESCUE	<input type="checkbox"/> DOES NOT APPLY	<input type="checkbox"/> Yes <input type="checkbox"/> N/A	Continuous monitoring for _____ (SUBSTANCE)	TESTED BY	TIME (FROM)	<input type="checkbox"/> A.M. <input type="checkbox"/> P.M.	TIME (TO)	
		<input type="checkbox"/> Yes <input type="checkbox"/> N/A	Periodic tests for _____ (SUBSTANCE)	TESTED BY	TIME (FROM)	<input type="checkbox"/> A.M. <input type="checkbox"/> P.M.	TIME (TO)	
		<input type="checkbox"/> Duration of work	<input type="checkbox"/> Area <input type="checkbox"/> Other					
		<input type="checkbox"/> Personal						
		2. <input type="checkbox"/> Yes <input type="checkbox"/> N/A	Fire/safety/confined space attendants	DESIGNATED PERSON(S)				HOW TO CONTACT
		3. <input type="checkbox"/> Yes <input type="checkbox"/> N/A	Backup rescuer(s)	DESIGNATED PERSON(S)				HOW TO CONTACT
4. <input type="checkbox"/> Yes <input type="checkbox"/> N/A	Special rescue service/equipment required	LOCATION OF SPECIAL EQUIPMENT				RESCUE SERVICE PHONE NU		

Figure 5.3

Safe Work Permit (KM-2565-1-B, lower section of front side)

SECTION 4		HOT WORK	YES NO N/A			YES NO	
			<input type="checkbox"/> DOES NOT APPLY	1. Fire Extinguisher (Type) _____ Is it full?			8. Ground lead attached to work
			2. Survey area for combustibles and openings, holes, trenches, etc.			9. Prevention of heat exposure to gasket, seals, liners	
			3. Combustible materials removed or protected			10. Other work in area which should be stopped	
			4. Heat/spark control - tarps, covers, water, etc.			11. Material present which emits vapor when heated	
			5. Precaution taken for hidden combustibles			12. Radiant heat transfer considered	
			6. Purge gas used. Type _____			13. Equipment operating or contains original contents	
			7. Adjacent areas safe/sewers protected			14. Ducts or conveyors plugged or protected	
SECTION 5		ENERGY LOCKED/TAGGED	YES NO N/A			YES NO	
			<input type="checkbox"/> DOES NOT APPLY	1. Line positively identified			9. Are all automatic valves secured in a safe position?
			2. Line equip. drained/cleaned, etc. per company procedure			10. Electrical panel switches locked, tagged and tested	
			3. Line/equipment cleaned and purged			11. Field switches tested	
			4. Blinds and/or block and bleed in place			12. Fuses removed/switches open	
			5. Lock(s) required (list lockout points)			13. Are belts/couplings removed?	
			6. Splash guards considered			14. Are rotating parts blocked?	
			7. Adjacent area safe. (If limited, describe below)			COMMENTS	
			8. Area roped/laced off				
SECTION 6		CONFINED SPACE	YES NO N/A			YES NO	
			<input type="checkbox"/> DOES NOT APPLY	1. Confined space entry required?			5. Have authorized entrants signed opposite side of this form?
			2. Space to be entered _____			6. Have designated attendants signed opposite side of this form?	
			3. Purpose of entry _____			7. Have all necessary hazard control measures been taken?	
			4. Is space a permit-entry space? If "YES", complete opposite column			8. Has all required equipment been provided?	
SECTION 7		TRENCHING/EXCAVATION	YES NO N/A			YES NO	
			<input type="checkbox"/> DOES NOT APPLY	1. Has the area been inspected for underground power lines or product lines?			4. Have precautions been taken if the trench/excavation develops into a confined space?
			2. Does the trench require shoring/bracing/support?			5. Have overhead power/product lines been removed or identified?	
			3. Has the soil been evaluated for stability?			6. Will leaking water or rain water affect the stability of the trench/excavation?	
SECTION 8		Questions to be Completed on Permit Expiration or Job Completion WORKER CLOSEOUT SIGNATURE	YES NO N/A			YES NO	
				1. Has the job been completed?			5. Have safety devices been reinstalled?
			2. Has the area been cleaned of work material?			6. Has hot work area been surveyed for smoldering materials?	
			3. Have department personnel been informed job is done?			7. Special precautions, concerns or remarks?	
			4. Have all locks and/or tags been removed?			COMMENTS	
		TIME					

Figure 5.3

Safe Work Permit (KM-2565-1-B, reduction of reverse side)

I have been instructed as a confined space attendant. I recognize the nature of the work to be performed and understand my duties.					
SIGNATURE		DATE	SIGNATURE		DATE
OBSERVERS, WATCHERS, RESCUERS					
I have been instructed in and am aware of the possible hazards and conditions I may encounter in this entry work.					
SIGNATURE		TIME (IN / OUT)	DATE	SIGNATURE	
SIGNATURE		TIME (IN / OUT)	DATE	SIGNATURE	
PERSONS AUTHORIZED TO PERFORM WORK AND OR TO ENTER CONFINED SPACE					
COMMENTS					
AUDIT PURPOSE ONLY	NAME	TITLE	DEPARTMENT	DATE	
CONCERNS					
CORRECTIVE ACTIONS					
COMPLETED BY	NAME	TITLE	DEPARTMENT	DATE	COMMENTS

6. COMMUNICATIONS

6.1 GENERAL COMMUNICATIONS

The Field Team Leader will have available at the Site the means for telephone communications, or an equivalent means of communication, for summoning emergency assistance from the fire/ambulance and police departments in the event they are required. The telephone will also act as a direct link to technical personnel for information pertaining to all phases of the project.

6.2 RADIOS/TELEPHONES

Short-range walkie talkies or cellular telephones will be made available to designated personnel working at the Site.

6.3 EMERGENCY WARNING

In the event of an emergency condition, the Field Team Leader will notify project personnel verbally if all are within immediate hearing and via a bull horn if the Site area is large. The Field Team Leader will also notify visitors present within the area. Site personnel will immediately proceed to a predesignated assembly area as designated by the Field Team Leader during the daily safety meeting. Personnel will remain in the designated area until further instructions are received by the Field Team Leader.

All communication equipment will be tested at the beginning of each day to verify operational integrity.

6.4 HAND SIGNALS

Hand signals will be used by field teams in conjunction with the buddy system. Hand signals shall be familiar to the entire field team before operations commence and should be reviewed during site-specific training.

<u>Signal</u>	<u>Meaning</u>
Hand gripping throat	Out of air; can't breathe
Grip partner's wrist	Leave area immediately; no debate
Hands on top of head	Need assistance
Thumbs up	OK; I'm all right; I understand
Thumbs down	No; negative

6.5 SITE SECURITY

Only authorized personnel will be permitted on the Site.

Visitors and other non-essential personnel may enter the work area only upon authorization by the Field Team Leader. This restricted access will ensure that the Field Team Leader can communicate with each person authorized to enter the work area.

7. PERSONNEL EXPOSURE AND AIR QUALITY MONITORING

7.1 AIR QUALITY (DUST)

Due to the nature of the principal contaminants associated with the project, dust suppression will be important as a means of minimizing exposure levels and off-site migration of contaminants. The Field Team Leader will routinely monitor the project area. The OSHA personal exposure limit (PEL) for nuisance dust is 15 mg/m^3 .

7.2 AIRBORNE RADIOACTIVITY MONITORING

Monitoring for airborne radioactivity exposure is as important as monitoring for external radiation exposure. Monitoring for airborne radioactivity exposure requires the following elements:

- Air sampling for radioactive particulates,
- Recordkeeping regarding personnel work locations and time in location, and
- Respiratory protective equipment records regarding devices used by workers in airborne radioactivity areas.

By closely monitoring these three elements, a continuous record of personnel exposure to airborne radioactivity is maintained.

Lapel samplers worn for personal air monitoring can be utilized for airborne radioactivity monitoring. Air filters shall be analyzed on a daily basis to determine potential contributions to dose from radionuclides. It is expected that naturally occurring radon and thorium daughters will interfere with analyses. Additional evaluation of samples shall be performed when determined necessary based upon elevated results. Such analyses shall be performed after allowing time for decay of some interfering radionuclides.

Downwind monitoring of the excavation areas for radioactive particulate activity also will be performed. High volume air samplers shall run continuously during operations and be evaluated on a daily basis for gross alpha activity. Comparisons will be made to 32 IAC 340 Appendix A to ensure that adequate radiological controls are in place for workers and the general public. As low as reasonably achievable (ALARA) concepts will be utilized when considering protective measures to ensure that internal exposures are minimized, while also considering the effects of such protective measures with respect to external exposures. Controls on the Site such as wetting of soils and procedural changes, will be employed prior to the prescription of respiratory protective

Airborne radon gas can represent a personnel exposure concern if allowed to accumulate in confined spaces. Open excavations which may qualify as OSHA confined spaces are not of a concern due to the ability of the gas to dissipate and accumulation time. Vaulted spaces which are ventilated as a normal confined space entry procedure will adequately relieve potential radon accumulations. If time and planning allow, working level measurements consisting of 5 minute sampling and 2 counts (90 minutes and 5 hours) can be taken to assess conditions.

Time decay of interfering nuclides generally refers to radon-222 decay and daughters but may also include thoron decay. The specific times for decay of samples is best addressed in procedures rather than in the health and safety plan. Air samples will be decayed a minimum of 5 hours to allow for counting without interference from radon-222 and its daughters. Thoron (Rn-220), if present in significant amounts, will require decay for up to 4 days to allow for decay of its Pb-212 daughter (10.6 hour half life).

After filters have been collected and decayed overnight, there will be a morning count of the filter that will serve to identify high gross counts for the previous day. This will alert health & safety staff of a potential problem which they can investigate more promptly. The count, after 4 days decay, will serve to be the official measurement of Th-Alpha.

7.3 INTERNAL MONITORING

Internal monitoring to determine intakes of radioactive material will be performed as needed based upon the results of the air sampling program. Bioassay methods to be considered should include *in-vivo*, as well as *in-vitro*, assessments. Routine bioassay of workers is not anticipated based upon the low concentrations of radioactivity in soils to be excavated.

7.4 EXTERNAL RADIATION MONITORING

External radiation monitoring of workers will be performed using film badges or thermoluminescent dosimeters. Dosimetry will be provided and processed by a service holding National Voluntary Laboratory Accreditation Program (NVLAP) certification. Pocket dosimeters may also be utilized for visitors and other infrequent personnel requiring access to the Site.

7.5 RADIOLOGICAL SURVEYS

Radiological surveys will be performed to ensure that radiation levels and contamination levels are within regulatory limits for workers and the general public. Radiation surveys will consist of ambient gamma surveys using micro-R meter (ion chamber or NaI) or tissue equivalent dose rate meter (Geiger-Mueller detectors), as appropriate, and contamination surveys.

7.6 CONTAMINATION MONITORING

Samples shall be obtained periodically in work areas to ensure that radioactivity is present at acceptable levels and is prevented from leaving the Site. Decontamination of elevated areas will be performed to maintain contamination at levels that are ALARA.

Before leaving the exclusion zone, Site personnel shall be checked through use of a hand-held frisker to ensure that contamination is not present on skin or clothes. The Field Team Leader will be immediately informed regarding any contamination on individuals and will initiate appropriate decontamination techniques. Proper disposition of contaminated personal effects and clothing also will be the responsibility of the Field Team Leader.

7.7 TOTAL ORGANIC VAPOR MONITORING

In addition to the radiological contaminants, there is a slight potential of encountering organic vapors. Organic vapors were encountered near the water table during previous investigation at the Site. Routine screening for total organic vapors will be conducted with a photoionization detector (PID), or similar type equipment, on a daily basis. The screening will evaluate ambient photoionization volatile organic vapors and some semi-volatile organic vapors.

Total organic vapors in ambient air will be obtained periodically with a PID during daily field activities. The PID provides real-time readings of exposure to volatile organics and some semi-volatile organics. Measurements will be made daily, prior to activities, to determine background levels. Monitoring measurements will be taken when:

- operations change,
- work moves to a different portion of the Site, and
- personnel observe contaminated materials.

These screening operations will be used to identify conditions requiring an upgrade to full-face respirators as described in Section 7.8.2.

7.8 ACTION LEVELS

7.8.1 Radiological Action Levels

Radiological action levels for on-site workers will be determined by smear/swipe measurements as well as airborne particulate monitoring for the presence of radioactivity. The Field Team Leader will perform radiological monitoring. The radioactive contamination on the Site is particulate and insoluble in water. Therefore, there will be no fixed contamination on the workers. Action levels as determined by radioactive monitoring can be found in Table 7.1.

To avoid the need for upgrade of personal protection equipment due to airborne contamination, engineering controls such as the use of water to minimize dust levels will be implemented as necessary during excavation and restoration activities.

7.8.2 Organic Vapors Action Levels

Permit Applicants will take a conservative approach to organic vapor monitoring at the Site. A PID will be used to monitor for organic vapors. Operations will be discontinued if the PID reads 5 ppm¹ or greater and the area will be evacuated. The Site Health and Safety Officer will retest the area wearing a full-face respirator. Operations will not resume until the PID reads less than 5 ppm, and remains below 5 ppm.

¹PID level obtained for Benzene from NIOSH Pocket Guide to Chemical Hazards.

TABLE 7-1

ACTION LEVELS AS DETERMINED BY RADIOACTIVITY

Note: Personnel shall not be exposed to airborne radioactivity such that their weekly intake exceeds 12 Derived Air Concentration (DAC)-hours without prior approval of the Field Team Leader or designee.

Level of protection may be increased to Level C (full-face air purifying respirator) when airborne monitoring indicates that contamination levels have reached 30% of the DAC. All assessments shall incorporate ALARA principles. Engineering controls shall be used prior to assignment of respiratory protective equipment.

Signs shall be posted at entrances to areas where airborne radioactivity levels exceed, or have the potential to exceed, 25% of the DAC.

Radiation Type	Action Level	Level of Respiratory Protection/Action
a. Contamination on smear samples	60 pCi/100 cm ² gross alpha ^(a)	Consider modified Level C (full-face APR) based upon ALARA evaluation.
b. Airborne Radioactivity	30% DAC ^(b)	Consider Level C (full-face APR) based upon ALARA evaluation. Ensure proper posting. Consider internal monitoring
c. Ambient Gamma (work areas)	5 mrem/hr ^(c)	Consider procedures for shielding of soils. Ensure proper posting.
d. Ambient Gamma (off-site areas)	2 mrem/hr ^(d)	Implement immediate controls to reduce dose equivalent rate.

Notes

- (a) This is approximately 3 times the unrestricted release criteria in the NRC Regulatory Guide 1.86. If any dry-brushing or otherwise abrasive-type decontamination of the sampled equipment is required, the Action Level shown shall require modified Level C (full-face APR).
- (b) Potential Airborne Radioactivity Area as defined in 10 CFR 20. Workers with 1000 DAC-hours per year to date must wear modified Level C (full-face APR) until the end of the calendar year.
- (c) The ambient gamma dose equivalent rate action level of 5 mrem/hr stems from the 10 CFR 20 radiation area definition. If the ambient gamma dose equivalent rate reaches 2 mrem/hr, one or more of the following actions will be implemented: The source may be shielded; the working distance from the source may be increased; or the worker's exposure time may be limited.
- (d) The ambient gamma action level for off-site is based upon the 10 CFR 20 requirements to maintain dose equivalent rates in unrestricted areas such that they do not exceed 0.002 rem in any one hour.

8. PERSONAL PROTECTIVE EQUIPMENT

It is anticipated that most excavation activities^{in designated exclusion zones} can be conducted in Level D personal protective equipment (PPE), with a contingency upgrade to Level C, based on the action levels listed in Section 7. Level C will be used when required by Special Work Permits, or when directed by the Field Team Leader.

Level D personal protective clothing and equipment for excavation activities includes:

- Coveralls, launderable or disposable
- Hard hat,
- Chemical resistant, OSHA approved safety shoes/boots,
- Cotton or leather gloves,
- Safety glasses, and
- Dust mask (optional).

Level C protective clothing and equipment includes:

- Full-face air-purifying respirator (NIOSH/MSHA approved) fitted with radionuclides/HEPA cartridges and/or organic vapor cartridges, depending on which action levels are exceeded (see Section 7 of this HASP),
- Coveralls,
- Tyvek coveralls - required in areas when splashing by contaminated soils or water is a possibility,
- Cotton or leather gloves,
- Disposable latex inner gloves - required in areas when splashing by contaminated soils or water is a possibility,
- Nitrile outer gloves (taped) - required in areas when splashing by contaminated soils or water is a possibility,
- Chemical-resistant steel toe boots, and
- Hard hat.

Action levels used to determine the need to upgrade or downgrade the levels of protection are described in Section 7 of this HASP.

9. CONTAMINATION REDUCTION PROCEDURES

9.1 EQUIPMENT

Portable equipment will be decontaminated with soap and water and rinsed with tap water. Heavy equipment will be steam-cleaned with water and, if necessary, a detergent solution. It is not anticipated that chemical cleaning will be necessary for decontamination.

9.2 PERSONNEL

If levels of radioactivity show that individuals can remove coveralls and other personal protective clothing and equipment before leaving the work-site and, thus complete decontamination, the individuals may leave the Site. If, however, levels of radioactivity show that individuals cannot achieve decontamination by the removal of coveralls and showering is required, they will be dressed in clean coveralls, boots and gloves and be transported to a hospital emergency room/trauma center capable of chemical contamination response to complete decontamination.

If substantial skin contamination occurs on an individual working with radioactive materials, the following specific procedures should be followed to prevent fixation of the material in the skin or absorption of the radioactivity through the skin.

Immediate Action: Notify the HSC or Field Team Leader, who will supervise the decontamination. If contamination is spotty, the HSC or Field Team Leader will supervise the cleaning of the individual spots with swabs, soap, or water. If the contamination is general, the HSC or Field Team Leader may recommend washing the area gently in warm or cool water (not hot) using hand soap (not detergent) for one minute. Rinse, dry, and monitor for radioactivity. This soap wash step may be repeated three times.

Evaluation: If the above procedure fails to remove all the skin contamination, the treatment should cease. An evaluation of the skin contamination should be performed by the HSC or Field Team Leader including an estimate of the dose commitment to the skin, and the quantity and identity of the nuclides contaminating the skin. If additional decontamination steps are necessary, they are performed and documented by the HSC. The guidelines for Personnel Decontamination in the Radiological Health Handbook, HEW 1970, beginning on page 194, can be used as applicable. CAUTION: Do not use chemicals for personnel decontamination until full evaluation of the contamination is made by the HSC or Field Team Leader.

9.3 CONTAMINATION PREVENTION

Work practices that minimize the spread of contamination will reduce worker exposure and help ensure valid sample results by precluding cross-contamination. Procedures for contamination avoidance include:

- knowing the limitations of all personal protective equipment being used,
- avoiding walking through areas of obvious or known contamination,
- refraining from handling or touching contaminated materials directly. Do not sit or lean on potentially contaminated surfaces,
- ensuring personal protective equipment has no cuts or tears prior to donning,
- fastening all closures on suits, covering with tape if necessary,
- taking steps to protect against any skin injuries,
- staying upwind of airborne contaminants, and
- when working in contaminated areas, refraining from eating, chewing gum, smoking, or engaging in any activity from which contaminated materials may be ingested.

9.4 DISPOSAL PROCEDURES

All discarded materials, waste materials, or other field equipment and supplies should be handled in such a way as to preclude the spread of contamination, creating a sanitary hazard, or causing litter to be left on-site. All potentially contaminated waste materials (e.g., clothing, gloves) shall be monitored and segregated in accordance with monitoring results into either radioactive or non-radioactive waste. Appropriate labels shall be affixed to all containers of radioactive materials.

10 GENERAL WORK PRECAUTIONS

10.1 GENERAL WORK PRECAUTIONS

The following general work precautions apply to all Site personnel.

- Eating, drinking, chewing gum or tobacco, smoking, or any practice that increases the probability of hand-to-mouth transfer and ingestion of material is prohibited in the work area.
- Hands and face must be thoroughly washed upon leaving the work area. Wash water will be provided at the Site for this purpose.
- Whenever levels of radioactivity warrant, the entire body should be thoroughly washed, as soon as possible, after the protective coveralls and other clothing are removed as part of the decontamination process.
- No facial hair that interferes with a satisfactory fit of the mask-to-face-seal is allowed on personnel required to wear respirators.
- Contact with contaminated or suspected contaminated surfaces should be avoided. Whenever possible, do not walk through puddles, leachate, discolored surfaces, kneel on ground, lean, sit, or place equipment on drums, containers, or the ground.
- Medicine, drugs and alcohol may interfere with or impair judgment and reaction times. Therefore, usage of prescribed drugs must be specifically approved by a qualified physician and made known to the Field Team Leader prior to an individual's presence on the work-site. Alcoholic beverage intake is strictly prohibited at the Site and prior to work.
- All personnel must be familiar with standard operating procedures and any additional instructions and information contained in the HASP.

- All personnel must adhere to the requirements of the HASP.
- Contact lenses are not permitted when respiratory protection is required or where the possibility of a splash exists.
- Personnel must be cognizant of symptoms for radiological exposure on-site, for heat stress and cold stress, and knowledgeable regarding emergency measures contained in the Emergency Contingency Plan.
- Respirators shall be cleaned and disinfected after each day's use or more often, if necessary.
- Prior to donning, respirators shall be inspected for worn or deteriorated parts. Emergency respirators or self-contained devices will be inspected at least once a month and after each use.
- Each employee shall be familiar with the project's Respiratory Protection Program.

10.2 OPERATIONAL PRECAUTIONS

The following operational precautions must be observed at all times.

- All Site personnel shall be adequately trained and thoroughly briefed on anticipated hazards, equipment to be worn, safety practices to be followed, emergency procedures, and communications.
- All required respiratory protective devices and clothing shall be worn by all personnel going into areas designated for wearing protective equipment.
- All Site personnel shall use the buddy system when wearing respiratory protective equipment. At a minimum, a third person, suitably equipped as a safety backup, is required during extremely hazardous entries.
- During continual operations, on-site workers act as a safety backup to each other. Off-site personnel provide emergency assistance.
- Personnel should practice any unfamiliar operations prior to undertaking the actual procedure.
- Entrance and exit locations shall be designated and emergency escape routes delineated. Warning signals for Site evacuation must be established.
- Personnel and equipment in the contaminated work area should be minimized, consistent with effective Site operations.

- Work areas for various operational activities shall be established.
- Procedures for leaving a contaminated area shall be planned and implemented prior to going on-site. Work areas and decontamination procedures shall be established based on expected Site conditions.
- Frequent and regular inspection of Site operations will be conducted to ensure compliance with the HASP. If any changes in operation occur, the HASP will be modified to reflect those changes.

11. SANITARY FACILITIES

11.1 POTABLE WATER

- a. An adequate supply of potable drinking water shall be maintained at all times immediately outside the Site. Drinking water shall meet all federal, state and local health requirements.
- b. Drinking water shall be supplied to project personnel via approved dispensing sources.
- c. Paper cups shall be permitted for the drinking of potable water supplies.
- d. Drinking water dispensers shall be clearly marked and shall, in no way, have the potential for contamination from non-potable supplies.
- e. Site personnel must be fully decontaminated prior to approaching the drinking water supply.

11.2 TOILET FACILITIES

- a. Adequate toilet facilities shall be provided at the Site.
- b. These facilities shall be in the form of portable chemical toilets.
- c. Routine servicing and cleaning of the toilets should be established with the selected contractor and shall be in accordance with federal, state, and local health regulations.
- d. Site personnel must be fully decontaminated prior to approaching the toilet facilities.

11.3 WASHING AREAS

- a. Adequate washing areas shall be provided for personal use within the work area.
- b. Washing areas shall be maintained in a sanitary condition and will be provided with adequate supplies of soap, towels for drying, and covered waste receptacles.
- c. Washing areas shall be maintained and sanitized daily.
- d. No eating, drinking or smoking shall be permitted in the work area. This policy will be strictly enforced by the Field Team Leader.

12. FIRE CONTROL EQUIPMENT

An adequate number of approved portable fire extinguishers (class rated A, B and C) shall be readily available at the Site at all times.

All Site personnel shall be trained in the use of the extinguishers. Extinguishers shall only be used on outbreak stage fires or fires of minor nature. The local fire department shall be contacted in the event of a larger fire and Site evacuation procedures should be commenced in accordance with the procedures described in the Emergency Contingency Plan.

13. CONFINED SPACE PROGRAM

13.1 PURPOSE

In the event that confined space work is a necessity, a Confined Space Program will be implemented. Training in the recognition of confined spaces is a component of the health and safety training program.

The purpose of the Confined Space Program is to establish procedures to protect personnel from this serious hazard in the course of their work; and at a minimum, to comply with 29 CFR OSHA 1910.146. This document assigns responsibilities and sets standards for personnel engaged in activities where confined spaces may be present.

13.2 RESPONSIBILITIES

13.2.1 Health and Safety Coordinator

The Health and Safety Coordinator administers the Confined Space Program. The Health and Safety Coordinator's responsibilities include:

- Review of the HASP for potential confined space hazards and design alternative approaches to accomplish the confined space tasks;
- Coordinating and managing the Confined Space Program in the event one is required;
- Establishing priorities for implementation of the program;
- Assisting with recognition and implementation of the Confined Space Program;
- Advising project management on confined space issues; and
- Communicating the Confined Space Program to personnel by training related to specific Site activities.

13.2.2 Project Manager

The Project Manager directs the application of the Confined Space Program to project work. The Project Manager is responsible for:

- Working with the Health and Safety Coordinator to prepare information describing activities that might be conducted in a confined space area;

- Assuring that all personnel engaged in project activities are familiar with the definition of a confined space;
- Assuring that personnel are familiar with the Confined Space Program, and that project activities are conducted in compliance with the Confined Space Program;
- Assuming the responsibilities of the Field Team Leader if another person is not assigned these responsibilities.

13.2.3 Field Team Leader

The Field Team Leader is responsible for the implementation of the Confined Space Program on-site during field activities. The Field Team Leader is responsible for:

- Overseeing implementation of the Confined Space Program during field operations; and
- Reporting confined space work activity, and any violations of the Confined Space Program, to the Project Manager and the Health and Safety Coordinator.

13.2.4 Personnel

Personnel are responsible for:

- Familiarizing themselves with the Confined Space Program and following it;
- Becoming familiar with the criteria for determining a confined space, and with the monitoring, permitting, and other requirements of the program; and
- Reporting immediately a confined space condition to the Field Team Leader.

13.3 DEFINITION OF A CONFINED SPACE

Confined space means a space that:

1. Is large enough and so configured that an employee can bodily enter and perform assigned work;
2. Has limited or restricted means for entry or exit (such as pits, storage bins, hoppers, crawl spaces, and storm cellar areas); and

3. Is not designed for continuous employee occupancy.

Any workspace meeting all of these criteria is a confined space and the Confined Space Program must be followed.

13.4 CONFINED SPACE ENTRY PROCEDURES

13.4.1 Safety Work Permit Required

All spaces shall be considered permit-required confined spaces until the pre-entry procedures demonstrate otherwise. The Safe Work Permit for entry into a confined space must be completed before work begins; it verifies completion of the items necessary for confined space entry. The Permit will be kept at the Site for the duration of the confined space work. If there is an interruption of work, or the alarm conditions change, a new Permit must be obtained before work begins.

A permit is not required when the space can be maintained for safe entry by 100% fresh air mechanical ventilation. This must be documented and approved by the Health and Safety Coordinator. Mechanical ventilation systems, where applicable, shall be set at 100% fresh air.

The Field Team Leader must certify that all hazards have been eliminated on the Entry Permit. If conditions change, a new permit is required.

13.4.2 Pre-entry Testing for Potential Hazards

a. Surveillance

Personnel first will survey the surrounding area to assure the absence of hazards such as contaminated water, soil, or sediment, barrels, tanks, or piping where vapors may drift into the confined space.

b. Testing

No personnel will enter a confined space if any one of these conditions exists during pre-entry testing. Determinations will be made for the following conditions:

1. Presence of toxic gases or dusts: Equal to or more than 5 parts per million (ppm) on the organic vapor analyzer with an alarm, above background outside the confined space area; or other action levels for specific gases, vapors, or dusts as specified in the Health and Safety Plan and the Confined Space Permit based on knowledge of Site constituents;
2. Presence of explosive/flammable gases: Equal to or greater than 10% of the Lower Explosive Limit (LEL) as measured with a combustible gas indicator or similar instrument (with an alarm); and

3. Oxygen Deficiency: A concentration of oxygen in the atmosphere equal to or less than 19.5% by volume as measured with an oxygen meter.

Pre-entry tests results will be recorded and kept at the Site for the duration of the job by the Field Team Leader. Affected personnel can review the test results.

c. Authorization

Only the Field Team Leader and the Health and Safety Coordinator can authorize any personnel to enter into a confined space. This is reflected on the Safe Work Permit for entry into a confined space. The Field Team Leader must assure that conditions in the confined space meet permit requirements before authorizing entry.

d. Safe Work Permit

An Safe Work permit for confined space entry must be filled out by the Health and Safety Coordinator or Field Team Leader. A copy of the Safe Work Permit is included as Figure 5.2.

e. Attendants

One worker will stand by outside the confined space ready to give assistance in the case of an emergency. Under no circumstances will the standby worker enter the confined space or leave the standby position. There shall be at least one other worker not in the confined space within sight or call of the standby worker.

f. Observation and Communication

Communications between standby worker and entrant(s) shall be maintained at all times. Methods of communication that may be specified in the Safe Work Permit and the HASP may include voice, voice by powered radio, tapping or rapping codes, signaling tugs on rope, and standby worker's observations that activity appears normal.

13.4.3 Rescue Procedures

Acceptable rescue procedures include entry by a team of rescuers only if the appropriate self-contained breathing apparatus (SCBA) is available; or use of public emergency services.

The standby worker must be trained in first aid, CPR, and respirator use. A first aid kit should be on hand and ready for emergency use. The standby worker must be trained in rescue procedures. Retrieval of an unconscious victim in a confined space will only be conducted by trained rescue personnel. An emergency call to 911 will be initiated to assist the victim.

13.5 TRAINING

Personnel who will engage in field activities will be given annual training on the requirements and responsibilities in the Confined Space Program and on OSHA 1910.146. Only trained personnel can work in confined spaces. Workers should be experienced in the tasks to be performed, instructed in proper use of respirators, lifelines and other equipment, and practice emergency procedures and self-rescue.

Before each Site activity, the determination of confined space work will be part of the Site characterization process. Training in the site-specific confined space activities will be part of the site-specific health and safety training.

13.6 SAFE WORK PRACTICES

- Warning signs should be posted. These include warnings for entry permits, respirator use, prohibition of hot work and emergency procedures and phone numbers.
- Cylinders containing oxygen, acetylene or other fuel such as gasoline must be removed a safe distance from the confined space work area.
- Purging and ventilating is done before work begins to remove hazardous vapors from the space. The space should be monitored to ensure that the gas used to purge the space (e.g. tank) has also been removed. Local exhaust should be used where general exhaust is not practical.
- The buddy system is used at all times. A standby person always must be posted within sight of, or in communication with, the person inside the confined space. The standby should not enter the confined space, but instead will call for help in an emergency and not leave the post. Communication should be maintained at all times with workers inside the confined space.
- Emergency planning in the HASP and an Safe Work Permit must be approved in advance and the proper rescue equipment must be immediately available.

14. ELECTRICAL LOCKOUT/TAGOUT

The Field Team Leader must approve all work in areas requiring lockout/tagout procedures. Specific procedures and permitting requirements will be specified in the HASP, or in a revised HASP based on the need for a worker to work around electrical equipment.

All systems must be locked out and tagged before the work begins. This includes pipes, air lines, electrical equipment and mechanical devices. The equipment must be start tested and approved for use by a worker by the Health and Safety Coordinator or the Field Team Leader by start-testing to make sure the locked-out equipment does not operate.

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